Denied

Affirmed

Motion to dismiss

Field

12-230

TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

No. 301. 45

JOSEPH GARNEAU, APPELLANT,

vs.

DOZIER, WEYL & COMPANY, JAMES DOZIER, AUGUSTUS WEYL, LEWIS D. DOZIER, AND JOHN F. DOZIER.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE EASTERN DISTRICT OF MISSOURI.

FILED OCTOBER 15, 1877.

No. 29

SUPREME COURT OF THE UNITED STATES.

No. 301.

JOSEPH GARNEAU, APPELLANT,

vs.

DOZIER, WEYL & COMPANY, JAMES DOZIER, AUGUSTUS WEYL, LEWIS D. DOZIER, AND JOHN F. DOZIER.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE EASTERN DISTRICT OF MISSOURI.

INDEX.

	Original.	Print
Bill filed, subpœna sordered	1	1
Bill of complaint	1	1
Subpœna in chancery	10	5
Marshal's return	11	5
Appearance of defendants	12	6
Answer	12	6
Endorsement	19	9
Supplementary bill filed	19	10
Supplementary bill	19	10
Subpœna in chancery	29	14
Marshal's return	30	15
Stipulation	30	15
Appearance	31	16
Answer to amended bill of complaint	31	16
Replication	35	18
Supplemental answer	36	18
Endorsement	36	19
Stipulation	37	19
Final decree	37	19
Motion to tax certain costs overruled	38	20
Appeal allowed, bond filed, and approved transcript ordered	38	20
Bond	39	20

DEPOSITIONS FOR COMPLAINANT.

Duncan McKenzie	41	21
Cross-examination	61	30

	Original.	Print.
Complainant's Exhibit, Hall Letter	71	34
Christian Bright	72	35
Cross-examination	76	37
Frank Millward	80	39
Cross-examination	89	42
McKenzie assignment	97	47
John T. Wilson	100	48
Cross-examination	106	50
Peter O. Anderson	107	51
Cross-examination	110	53
David Fithian	113	54
Cross-examination	115	55
Samuel W. Osmun	115	55
Cross-examination	116	55
Redirect examination	116	56
Frank Millward	116	56
DEPOSITIONS FOR RESPONDENTS.		
James Hall	127	61
Cross-examination	131	63
Recalled	132	64
Cross-examination	133	64
Transcript of record from circuit court of United States for southern district of Ohio	135	65
Henry Millward	153	75
Cross-examination	165	81
Re-examination	170	83
John Bailie	171	83
Cross-examination	172	85
Leander Hillon	172	85
Cross-examination	173	85
William A. Root	174	86
Cross-examination	176	87
Jeremiah Byrns	176	87
Cross-examination	178	88
Re-examination	180	89
Recross-examination	180	89
Re-examination	180	89
Recross-examination	180	89
McKenzie file wrapper and contents	181	90
G. K. Withington	190	95
Cross-examination	193	96
Re-examination	196	98
EXHIBITS.		
Complainant's Exhibit, F. M. No. 1	197	98
Complainant's Exhibit, McKenzie Drawing	199	98
McKenzie original patent	201	98
Complainant's Exhibit, McKenzie Reissue	209	101
Sellique patent	219	104
Sellique patent, translation	227	107
Mathiew Carrot patent	235	110
John Ball patent	239	111

	Original.	Print.
Vicar's English patent	247	113
Smith's English patent	255	116
Ball's original patent	265	119
Ball assignment	271	121
Ball extension	273	122
Jennison patent	275	123
Jennison reissue	285	126
Jennison extension	297	130
McKeuzie's downward draught	299	131
Opinion	309	133
Clerk's certificate	311	133

1 UNITED STATES OF AMERICA,
Eastern District of Missouri, ss:

In the circuit court of the United States in and for said district.

Be it remembered that on the 12th day of June, A. D. 1875, the following proceedings were had and appear of record in the circuit court of the United States for the eastern district of Missouri, to wit:

Bill filed.—Subpœnas ordered.

JOSEPH F. GARNEAU, COMPLAINANT,
vs.
DOZIER, WEYL AND COMPANY, DEFENDANTS. } No. 560.

This day comes the plaintiff, by Hatch and Parkinson, his solicitors, and files his bill of complaint against the defendants herein, and on motion of said solicitors it is ordered that subpœnas in chancery issue against said defendants, returnable to rules Monday July 5th, 1875; which said bill of complaint is in the words and figures following, to wit:

Bill of complaint.

Circuit court of the United States in and for the eastern district of Missouri. In equity.

JOSEPH F. GARNEAU
vs.
DOZIER, WEYL AND CO.; JAMES DOZIER, Augustus Weyl, Louis D. Dozier, and John T. Dozier.

To the honorable the judges of the circuit court of the United States in and for the eastern district of Missouri:

Joseph F. Garneau, of the city and county of St. Louis, in the State of Missouri, and citizen of said State, bring this bill against James Dozier, Augustus Weyl, Louis D. Dozier, and John T. Dozier, part-
2 ners, doing business under the firm name of Dozier, Weyl & Co., and all residents of and doing business in said St. Louis County and State aforesaid.

And thereupon your orator complains and says that heretofore and before the 23rd day of September, 1856, Hosea Ball was the true, original, and first inventor of a certain new and useful improvement in ovens, not known or used before said invention, and not at the time of his application for a patent in public use or on sale with his consent or allowance.

And your orator further shows unto your honors that the said Hosea Ball, being as aforesaid the inventor of said improvement, and being a citizen of the United States, made application to the Commissioner of Patents for letters-patent in accordance with the then existing acts of Congress, and having duly complied in all respects with the conditions and requisitions of said acts, on the 23rd day of September, 1856, letters-patent of the United States, signed, sealed, and executed in due form of law, for the said invention or discovery were issued to him, said Hosea

Ball, which said letters patent were numbered 15753, whereby there was secured to him, his heirs, executors, administrators or assigns, for the term of 14 years from the 23rd day of September, 1856, the full and exclusive right of making, using, and vending to others to be used, the said improvement, which said letters-patent are now of record in the Patent-Office of the United States, and which, or a duly certified copy of the same, are ready in court to be produced.

3 And your orator further shows unto your honors that on or about the 16th day of August, 1868, the said Hosea Ball, by an assignment in writing of that date, sold, assigned, and transferred unto your orator all his right, title, and interest in and to said letters-patent and invention, and all extensions and renewals or reissues thereof in and for the county of St. Louis, State of Missouri, which said assignment was duly recorded in the Patent-Office of the United States.

And your orator further shows unto your honors that no more than six months and not less than ninety days before the expiration of the original term of said last-mentioned patent, the said Hosea Ball made application for the extension of the term of said last-mentioned letters-patent for seven years from and after September 23rd, 1870; and after full examination by the Commissioner of Patents the extension was granted and said letters-patent were by the certificate of said Commissioner declared to have the same effect as if originally granted for twenty-one years, as will more fully appear by said certificate of extension, or a duly certified copy thereof, ready in court to be produced.

And further, your orator complains and says that heretofore and before the 1st day of May, 1860, Duncan McKenzie was the true, original, and first inventor of a certain new and useful improvement in bakers' ovens not known or used before said invention, and not at the time of his application for a patent in public use or on sale with his consent or allowance.

4 And your orator further shows unto your honors that the said Duncan McKenzie having assigned his right, title, and interest in said improvement to Mary Ann Elizabeth McKenzie, and being, as aforesaid, the inventor of said improvement, and being a citizen of the United States, made application to the Commissioner of Patents for letters-patent in accordance with the then existing acts of Congress, and having duly complied in all respects with the conditions and requisitions of said acts, on the 1st day of May, 1860, letters-patent of the United States, signed, sealed, and executed in due form of law, for the said invention or discovery, were issued to the said Mary Ann Elizabeth McKenzie, assignee as aforesaid, whereby there was secured to her and to her heirs, executors, administrators or assigns, for the term of 14 years from the said 1st day of May, 1860, the full and exclusive right of making, using, and vending to others to be used, the said improvement, which said letters-patent are now of record in the Patent-Office of the United States.

And your orator further shows unto your honors that said Mary Ann Elizabeth McKenzie, having for good and lawful cause surrendered said letters patent to the Commissioner of Patents, and having made application therefor, and having in all things complied with the acts of Congress in such case made and provided, they were cancelled and new letters patent, which were marked Reissue No. 3929, were on the 19th day of April, 1870, in due form of law, issued to said Mary Ann Elizabeth McKenzie, which said last-mentioned reissued letters patent are of record in the Patent Office of the United States.

5 And your orator further shows unto your honors that on or about the 24th day of March, 1874, the said Mary Ann Elizabeth

McKenzie, by an assignment in writing of that date, sold, assigned, and transferred unto said Duncan McKenzie all her right, title, and interest in and to said letters patent and invention, which said assignment was duly recorded in the Patent Office of the United States.

And your orator further shows unto your honors that not more than six months and not less than ninety days before the expiration of the original term of said last-mentioned reissued patent, said Duncan McKenzie made application for the extension of the term of said last-mentioned reissued letters patent, for seven years from and after May 1st, 1874, and after full examination by the Commissioner of Patents the extension was granted, and said letters patent were, by the certificate of said Commissioner, declared to have the same effect as if originally granted for twenty-one years, which said certificate of extension, or a duly certified copy thereof, is ready in court to be produced.

And your orator further shows unto your honors that on or about the 2nd day of June, 1874, the said Duncan McKenzie, by an assignment in writing of that date, sold, assigned, and transferred unto your orator all his right, title, and interest in and to said letters patent and invention, and all reissues and extensions thereof, in and for the county of St. Louis, State of Missouri, which said assignment was duly recorded in the Patent Office of the United States.

6 Your orator further shows unto your honors that said Duncan McKenzie having, for good and lawful cause, surrendered said letters patent to the Commissioner of Patents, and having made due application therefor, and having in all things complied with the acts of Congress in such case made and provided, they were cancelled and new letters patent, which were marked Reissue No. 6397, were, on the 20th day of April, 1875, in due form of law issued to said Duncan McKenzie, which said last-mentioned reissued letters patent are of record in the Patent Office of the United States, and which, or a duly certified copy thereof, are ready in court to be produced.

And your orator further shows unto your honors that by virtue of the premises he became and now is the sole and exclusive owner of said several letters patent, to wit, letters patent No. 15753, and reissued letters patent No. 6397, in and for said St. Louis County, and the inventions and improvements described therein, and of all the rights and privileges granted and secured, or intended to be granted and secured thereby, and that since he became the owner thereof as aforesaid he has invested and expended large sums of money and been to great trouble in and about said invention and for the purpose of carrying on the business of constructing and using said improvements, and making the same profitable to himself and useful to the public; and that said invention has been and is of great benefit and advantage, and that ovens were made according to said invention and used by said Joseph F. Garneau, your orator, to great advantage to the public, and

7 that the public have generally acknowledged and acquiesced in the aforesaid rights of your orator; and your orator believes that he will realize and receive large gains and profits therefrom if infringements by said defendants and their confederates shall be prevented. Yet the said defendants, well knowing the premises and the rights secured to your orator as aforesaid, but contriving to injure your orator, and to deprive him of the benefits and advantages which might and otherwise would accrue unto him from said invention, after issuing of the letters patent as aforesaid, and before the commencement of this suit, did, as your orator is informed and believes, without the license or allowance and against the will of your orator and in violation of his

rights, and in infringement of the aforesaid letters patent No. 15753, and reissue No. 6397, unlawfully and wrongfully, and in defiance of the rights of your orator, make, construct, and use the said inventions, and did make, construct, and use ovens made according to and employing and containing said inventions, and that they still continue so to do.

And your orator further shows unto your honors that said improvements described and claimed in said letters patent, respectively, to wit, No. 15753 and reissue No. 6397, are capable of being used in one and the same oven, and have been so made and used by the defendants herein, and that they have been so made and used as hereinbefore alleged by said defendants within the said county of St. Louis, State of
8 Missouri, since your orator has been in the exclusive owner of all right, title, and interest in said letters patent, in and for said county of St. Louis as aforesaid, and are still being used by said defendants in said county, all in defiance of the rights acquired by and secured to your as aforesaid, and to his great and irreparable loss and injury, and by which he has been and still is being deprived of great gains and profits which he might and otherwise would have obtained, but which have been received and enjoyed and are being received and enjoyed by the said defendants, by and through their aforesaid unlawful acts and doings.

And your orator further shows unto your honors, on information and belief, that said defendants have made and sold large quantities of bread and crackers baked in said ovens, and have a large quantity on hand, which they are offering for sale, and have made and realized large profits and advantages therefrom, but to what extent and how much exactly your orator does not know and prays a discovery thereof; and your orator says that the use of the said invention by said defendants, and this preparation for an avowed determination to continue the same, and their other aforesaid unlawful acts, in disregard and defiance of the rights of your orator, have the effect to and do encourage and induce others to venture to infringe said patent, in disregard of your orator's rights.

And your orator further shows unto your honors that he has caused notice to be given to said defendants of said infringements and of the rights of your orator in the premises, and requested them to de-
9 sist and refrain therefrom, but they have disregarded said notice and refused to desist from said infringements, and still continue to make and use said ovens embracing said improvements.

And forasmuch as your orator can have no adequate relief except in this court, to the end that the defendants may be compelled to account for and pay over the income thus unlawfully derived from the violation of the rights of your orator as above, and be restrained from any further violation of said rights, your orator prays that your honors may grant a writ of injunction, restraining the defendant from any further construction or sale or use in any manner of said patented ovens or any part thereof, in violation of the rights of your orator as aforesaid, and that the ovens now in possession or use of said defendants may be destroyed or delivered up to your orator for that purpose, and also that your honors, upon the entering of a decree for infringement as above prayed for, may proceed to assess or cause to be assessed under your direction, in addition to the profits to be accounted for by the defendants as aforesaid, the damages your orator has sustained by reason of such infringement, and that your honors may increase the actual damages so assessed to a sum equal to three times the amount of such assessment, under the circumstances of the willful and unjust infringement by said defend-

ants as herein set forth. And your orator prays also for a provisional or preliminary injunction, and for such other relief as the equity
10 of the case may require, and as to your honors may seem meet.

May it please your honors to grant unto your orator a writ of injunction conformable to the prayer of this bill, and also a writ of subpœna of the United States of America, directed to the said James Dozier, Augustus Weyl, Louis D. Dozier, and John T. Dozier, and the firm of Dozier, Weyl & Co., and commanding them to appear and answer unto this bill of complaint, and to abide and perform such order and decree in the premises as the court shall seem meet and be required by the principles of equity and good conscience.

JOSEPH F. GARNEAU.
HATCH AND PARKINSON,
Solicitors for Complainant.

HATCH and PARKINSON,
Of Counsel.

UNITED STATES OF AMERICA,
Eastern District of Missouri, ss:

On this eleventh day of June, 1875, before me personally appeared Joseph F. Garneau, the above named complainant, who, being by me duly sworn, deposes and says that he has read the foregoing bill of complaint subscribed by him and knows the contents thereof, and that the same is true of his own knowledge, except as to the matters therein stated on information and belief, and as to those matters he believes it to be true.

M. M. PRICE, *Clerk*,
By C. M. WARD, *D. C.*

And thereupon a subpœna in chancery was issued out of the clerk's office of said circuit court, which, with the marshal's return thereon, is in the words and figures following, to wit:

Subpœna in chancery.

UNITED STATES OF AMERICA,
Eastern District of Missouri, sct:

11 In the circuit court of the United States in and for the said district.

The President of the United States to James Dozier, Augustus Weyl, Louis Dozier, and John T. Dozier, composing the firm of Dozier, Weyl & Co., greeting:

You are hereby commanded to be and appear at rules to be held in the office of the clerk of the circuit court of the United States in and for the eastern district of Missouri, on the first Monday of July next, at the city of St. Louis, then and there to answer the bill of complaint of Joseph F. Garneau, citizen of the State of Missouri, filed against you on the 12th day of June, 1875; hereof fail not.

Witness the honorable Morrison R. Waite, Chief Justice of the United States, the 14th day of June, 1875.

Issued at office in the city of St. Louis, under the seal of said circuit court, the day and year aforesaid.

[SEAL.]

M. M. PRICE, *Clerk*,
By C. M. WARD, *Deputy.*

MEM.—The defendants to enter their appearance in this suit in the clerk's office, on or before the day at which the writ is returnable, otherwise the bill may be taken pro confesso.

M. M. PRICE, *Clerk*,
By C. M. WARD, *Deputy*.

Marshal's return.

UNITED STATES OF AMERICA,
Eastern District of Missouri, set:

Executed this writ by delivering a copy of the subpœna in chancery, together with a copy of the bill of complaint, to the within named James Dozier, a copy of the subpœna in chancery to the within named L. F. Dozier, Jno. T. Dozier, and A. Weyl, at St. Louis, within said district, this 15th day of June, 1875.

12 C. A. NEWCOMB,
United States Marshal Eastern District of Missouri,
By F. NEWCOMB, *Deputy*.

And afterwards, to wit, on June 24th, 1875, the defendants entered their appearance in said cause as follows, to wit:

Appearance of defendants.

United States circuit court, eastern district of Missouri. In equity.

JOSEPH F. GARNEAU
vs.
DOZIER, WEYL & CO. ET AL. } No. 560.

Wood and Boyd, solicitors for the defendants, appear for them.

WOOD AND BOYD,
Sol's for Def'ts.

And afterwards, to wit, on August 7th, 1875, the defendants filed their answer, which is as follows, to wit:

Answer.

Circuit court of the United States for the eastern district of Missouri.
In equity.

JOSEPH F. GARNEAU
vs.
DOZIER, WEYL & CO. ET AL. } No. 560. Answer.

The joint and several answer of James Dozier, Augustus Weyl, John T. Dozier, and Louis D. Dozier, partners under the firm name of Dozier, Weyl & Co., defendants, to the bill of complaint of Joseph F. Garneau, complainant.

These defendants, now and at all times hereafter saving and reserving to themselves all and all manner of benefit and advantage of exception that may be had or taken to the manifold errors, uncertainties, and insufficiences of said bill of complaint, for answer thereto, or to so much and such parts thereof as they are advised it is material or

13 necessary for them to make answer unto, answering, say:

That they are informed and believe, and therefore admit, that letters patent for an alleged "improvement in ovens" were granted to Hosea Ball September 23rd, 1856, but deny that said Ball was the original and first inventor of said alleged improvements; and the defendants further admit that some interest in said letters patent and alleged invention was conveyed by said Ball to the complainant, but as to the date, extent, and effect of said assignment, they have no sufficient information to ground a belief, and therefore ask that the complainant may be required to make strict proof of his title.

And these defendants, further answering, deny that said letters patent were, by the Commissioner of Patents, extended for seven years from and after September 23rd, 1870, and on information and belief say that before that date, and on or about October 12th, 1869, said Ball surrendered said letters patent to the Commissioner of Patents, and the same were thereupon cancelled, as appears of record in said Patent Office.

And these defendants, further answering, admit that letters patent for an alleged "improvement in ovens" were granted to Mary Ann Elizabeth McKenzie, May 1st, 1860, but deny that said Duncan McKenzie was the original and first inventor or discoverer of said last-named alleged improvements.

And these defendants, further answering, say that they have no information upon which to form a belief as to whether any of the
14 alleged assignments of said last-named letters patent, or of the alleged reissues founded thereon, were in fact made and recorded as required by law, and they therefore leave the complainant to make such proof of the same as he may be advised is necessary.

And these defendants, further answering, on information and belief, deny that said original patent No. 28,130, granted to Mary A. E. McKenzie was surrendered to the Commissioner of Patents, and said several reissues obtained for good and lawful cause, or because said original patent was inoperative and invalid by reason of a defective or insufficient description or specification, or for any lawful cause; and these defendants, on information and belief, say that if said original patent was inoperative or invalid it was not through inadvertancy, accident, or mistake, and without any fraudulent or deceptive intention on the part of said Duncan McKenzie, but on the contrary these defendants, on like information and belief, say that said several surrenders were made for other and different causes than those for which letters patent can or could be lawfully surrendered, and among other things were made to obtain, and that said Duncan McKenzie did obtain, contrary to the provisions of the statute in such case made and provided, said reissued letters patent No. 6,397, for more and other matters and things than those of which he was the original and first inventor, and more than were described or included in the specification attached to the original patent, or shown in the drawing attached thereto, or in the model
15 filed in the Patent Office at the time of the application for said original patent, and that said last-named reissue is not for the same invention for which said original patent No. 28,130 was issued; and these defendants, further answering, deny that said Duncan McKenzie was the original and first inventor or discoverer of the alleged invention, or of any substantial part thereof, as specified in the first claim of said reissue No. 6,397 so granted to him as aforesaid, wherefore defendants are advised and believe that said reissue is void and of no effect.

And these defendants, further answering, say that they are not advised, save by said bill, whether said reissue No. 3,929 was extended

upon application therefor as alleged, and leave the complainant to make proof thereof as he may be advised.

And these defendants, further answering, admit that the complainant has had constructed at St. Louis two ovens, and that he and his partners have used them in the ordinary course of business as bakers, but deny that he has in any other way carried on the business of constructing said alleged improvements, and they deny that the public have generally acknowledged and acquiesced in the alleged rights of complainant.

And these defendants, further answering, admit that in the year 1874 said firm of Dozier, Weyl & Co. had contracted for its own use, by James Hall, two ovens, which they have since used, and are now using, in the usual course of their business as bakers, but deny that said ovens are, or that either of them is, an infringement upon the letters
16 patent mentioned in said bill of complaint, or in anywise a violation of any right lawfully secured to the complainant thereunder, and say that said ovens are, as they are informed and believe, the invention of said Hall, to whom the exclusive right to make, use, and vend to others to be used, is secured by letters patent of the United States No. 108,258, granted to him October 11th, 1870, for "improvement in bake-ovens."

And these defendants, further answering, on information and belief, say that the ovens shown and specified in said patents upon which the bill is founded, are not, nor is either of them, an improvement in the art of baking, and are not useful, but on the contrary worthless as compared with those in use at the dates of their alleged invention, and defendants further say that in view of the state of the art at the date of the alleged invention by Duncan McKenzie, said reissue No. 6,397 is void, as the production of the devices therein shown did not involve the exercise of any invention or discovery.

And these defendants, further answering, on information and belief, deny that the devices specified as improvements and claimed in said letters patent No. 15,753 and reissue No. 6,397, are capable of being used in one and the same oven, or that they have ever been so used by the defendants, who pray the same benefit from this answer as if they had set up the matter stated by plea.

And these defendants, having fully answered the bill of complaint, by way of further defence say, on information and belief, that prior
17 to the alleged improvements by Hosea Ball and Duncan McKenzie, the same, or substantial and material parts thereof, had been shown and described in numerous letters patent and printed publications, and among others in the following:

English letters patent No. 3337, dated May 5th, 1810, granted to Isaac Coffin, for improvements in bake-ovens.

English letters patent No. 1138, dated December 22nd, 1852, granted to T. and T. Vicars, for improvements in bake-ovens.

English letters patent No. 13339, of 1850, granted to John Ball, for improvements in bake-ovens.

English letters patent to James Smith, for improvements in bake-ovens.

French letters patent No. 7071, granted to Mathicia Carrat, March 31st, 1840, for rotary baking-oven.

French letters patent granted M. Covelet for bake-ovens, dated June 13th, 1846.

French letters patent granted A. F. Sellique for bake-oven, dated September 24th, 1829.

French letters patent granted to Jean Launе for bake-ovens, dated October 17th, 1825.

And these defendants further say, on information and belief, that prior to the alleged invention by said Duncan McKenzie, the same or substantial or material parts thereof had been shown and described in the following letters patent of the United States:

No. 15753, dated September 23d, 1856, granted to Hosea Ball, for oven.

No. 22809, dated February 1st, 1859, granted to George C. Jemieson, for improvements in bakers' ovens.

18 And these defendants deny all and all manner of unlawful combination and confederacy wherewith they are by the said bill charged, and of all wrongful acts of whatever nature. Wherefore they say that the complainant is not entitled to an injunction, nor to an account, or to any other relief against these defendants as prayed for in said bill of complaint, without this, that any other cause, matter, or thing in said bill of complaint material or necessary for these defendants to make answer unto, is true to the knowledge or belief of these defendants, all which matters and things these defendants are willing to aver, maintain, and prove as this honorable court shall direct, and humbly pray to be hence dismissed with their reasonable costs and charges in this behalf most wrongfully sustained.

DOZIER, WEYL & CO.
JAMES DOZIER.
AUGUSTUS WEYL,
Per L. D. DOZIER.
JOHN T. DOZIER.
LEWIS D. DOZIER.

WOOD and BOYD,
Solicitors for Respondents.

UNITED STATES OF AMERICA,
Eastern District of Missouri, ss:

Lewis D. Dozier, one of the defendants, being duly sworn, deposeth and says that he has read the foregoing answer signed by him and knows the contents thereof, and that the same is true of his own knowledge, except as to those matters which are therein stated on information and belief, and as to those matters he believes it to be true.

LEWIS D. DOZIER.

Subscribed and sworn to before me this 7th day of August, 1875.

M. M. PRICE, *Clerk*,
By A. P. SELBY, *D. C.*

19 *Endorsement.*

We consent that the within answer may be filed and default waived on or before Aug. 9th, 1875.

HATCH AND PARKINSON.

And afterwards, to wit, on September 6th, 1875, the following further proceedings were had in said cause, to wit:

Supplementary bill filed.

JOSEPH F. GARNEAU, PLAINTIFF,
vs.
DOZIER, WEYL & CO., ET AL., DEFENDANTS. } 560.

This day comes the plaintiff, by his solicitors, and on motion leave is granted plaintiff to file supplementary bill; and it is thereupon ordered that subpœnas in chancery issue against the defendants named in said supplementary bill, returnable to November rules.

Which said supplementary bill is in the words and figures following, to wit:

Supplementary bill.

Circuit court of the United States in and for the eastern district of Missouri. In equity.

JOSEPH F. GARNEAU
vs.
DOZIER, WEYL & CO., JAMES DOZIER, Augustus Weyl, Louis D. Dozier, and John T. Dozier.

To the honorable the judges of the circuit court of the United States in and for the eastern district of Missouri:

Joseph F. Garneau, of St. Louis, in the State of Missouri, and a citizen of said State, bring this bill against James Dozier, Augustus Weyl, Louis D. Dozier, and John T. Dozier, partners doing business under the firm name of Dozier, Weyl & Co., and all residents of and
20 doing business in said St. Louis County and State aforesaid.

And, thereupon, your orator complains and says that heretofore and before the 23rd day of September, 1856, Hosea Ball was the true, original, and first inventor of a certain new and useful improvement in ovens, not known or used before said invention and not at the time of his application for a patent in public use or on sale with his consent or allowance.

And your orator further shows unto your honors that the said Hosea Ball, being as aforesaid the inventor of said improvement, and being a citizen of the United States, made application to the Commissioner of Patents for letters patent in accordance with the then existing acts of Congress, and having duly complied in all respects with the conditions and requisitions of said acts, on the 23rd day of September, 1856, letters patent of the United States, signed, sealed, and executed in due form of law, for the said invention or discovery, were issued to him, said Hosea Ball, whereby there was secured to him, his heirs, executors, administrators or assigns, for the term of fourteen years from the 23rd day of September, 1856, the full and exclusive right of making, using, and vending to others to be used, the said improvement, which said letters patent are now of record in the Patent Office of the United States.

And your orator further shows unto your honors that on or about the sixteenth day of August the said Hosea Ball, by an assignment in writing of that date, sold, assigned, and transferred unto your
21 orator all his right, title and interest in and to said letters patent and invention, and all reissues and extentions thereof, in and for the said county of St. Louis, State of Missouri, which said assignment was duly recorded in the Patent Office of the United States.

And your orator further shows unto your honors that said Hosea Ball, with the consent and acquiescence of your orator, having for good and lawful cause surrendered said letters patent to the Commissioner of Patents, and having made due application therefor, and having in all things complied with the acts of Congress in such case made and provided, they were cancelled and new letters patent, which were marked Reissue No. 3666, were on the 12th day of October, 1869, in due form of law issued to said Hosea Ball, which said last mentioned reissued letters patent are of record in the Patent Office of the United States.

And your orator further shows unto your honors that said Hosea Ball, with the consent and acquiescence of your orator, having for good and lawful cause surrendered said letters patent to the Commissioner of Patents, and having made due application therefor, and having in all things complied with the acts of Congress in such case made and provided, they were cancelled and new letters patent, which were marked Reissue No. 4026, were on the 14th day of June, 1870, in due form of law issued to said Hosea Ball, which said last mentioned reissued letters patent are of record in the Patent Office of the United States, and which, or a certified copy of the same, are ready here in court to be produced.

22 And your orator further shows unto your honors that no more than six months and not less than ninety days before the expiration of the original term of said last mentioned patent the said Hosea Ball made application for the extension of the term of said last mentioned reissued letters patent for seven years from and after September, 1870, and after full examination by the Commissioner of Patents the extension was granted, and said letters patent were by the certificate of said Commissioner declared to have the same effect as if originally granted for twenty one years, as will more fully appear by said certificate of extension or a duly certified copy thereof, ready in court to be produced.

And further your orator complains and says that heretofore and before the 1st day of May, 1860, Duncan McKenzie was the true, original, and first inventor of a certain new and useful improvement in baker's ovens not known or used before said invention and not at the time of his application for a patent in public use or on sale with his consent or allowance.

And your orator further shows unto your honors that the said Duncan McKenzie having assigned his right, title, and interest in said improvement to Mary Ann Elizabeth McKenzie, and being as aforesaid the inventor of said improvement and being a citizen of the United States, made application to the Commissioner of Patents for latters patent in accordance with the then existing acts of Congress, and having duly complied in all respects with the conditions and requisitions of said acts on the 1st day of May, 1870, letters patent of the

23 United States, signed, sealed, and executed in due form of law for the said invention or discovery were issued to said Mary Ann Elizabeth McKenzie, assigned as aforesaid, whereby there was secured to her and to her heirs, executors, administrators, or assigns, for the term of 14 years from the 1st day of May, 1860, the full and exclusive right of making, using, and vending to others to be used th e said improvement, which said letters patent are now of record in the Patent Office of the United States.

And your orator further shows unto your honors that Mary Ann Elizabeth McKenzie, having for good and lawful cause surrendered said letters patent to the Commissioner of Patents, and having made due

application therefor and having in all things complied with the acts of Congress in such case made and provided, they are cancelled and new letters patent, which were marked Reissue No. 3929, were on the 19th day of April, 1870, in due form of law issued to her, said Mary Ann Elizabeth McKenzie, which said last mentioned reissued letters patent are of record in the Patent Office of the United States.

And your orator further shows unto your honors that on or about the 24th day of March, 1874, the said Mary Ann Elizabeth McKenzie, by an assignment in writing of that date, sold, assigned, and transferred unto said Duncan McKenzie, all her right, title, and interest in and to the said letters patent and invention, which said assignment was duly recorded in the Patent Office of the United States.

And your orator further shows unto your honors that not more than six months and not less than ninety days before the expiration
24 of the original term of said last mentioned reissued patent said Duncan McKenzie made application for the extension of the term of said last mentioned letters patent for seven years from and after May 1st, 1874, and after full examination by the Commissioner of Patents the extension was granted and said letters patent were by the certificate of said Commissioner declared to have the same effect as if originally granted for twenty one years, which said certificate of extension or a duly certified copy thereof is ready in court to be produced.

And your orator further shows unto your honors that on or about the 2nd day of June, 1874, the said Duncan McKenzie, by an assignment in writing of that date, sold, assigned, and transferred unto your orator all his right, title, and interest in and to said letters patent and invention and all reissues and extensions thereof in and for the county of St. Louis, and State of Missouri, which said assignment was duly recorded in the Patent Office of the United States.

And your orator further shows unto your honors that said Duncan McKenzie, with the consent and acquiescence of your orator, having for good and lawful cause surrendered said letters patent to the Commissioner of Patents, and having made due application therefor, and having in all things complied with the acts of Congress in such case made and provided, they were cancelled, and new letters patent which were marked Reissue No. 6397, were on the 20th day of April, 1875, in due form of law issued to said Duncan McKenzie, which said last mentioned reissued letters patent are of record in the Patent Office of the United States, and which, or a duly certified copy thereof, are ready in court
25 to be produced.

And your orator further shows unto your honors that by virtue of the premises he became and now is the sole and exclusive owner of said several letters patent, to wit, reissued letters patent No. 4026 and reissued letters patent No. 6397, in and for said St. Louis County and the inventions and improvements described therein, and of all the rights and privileges granted and secured, or intended to be granted and secured thereby, and that since he became the owner thereof as aforesaid he has invested and expended large sums of money and has been to great trouble in and about said invention, and for the purpose of carrying on the business of constructing and using said improvements and making the same profitable to himself and useful to the public, and that said invention has been and is of great benefit and advantage, and that ovens were made according to said invention and used by said Joseph Garneau, your orator, to great advantage to the public, and that the public have generally acknowledged and acquiesced in the aforesaid rights of your orator, and your orator believe' that he will realize and receive large gains

and profits therefrom if infringements by said defendants and their confederates shall be prevented. Yet the said defendants, well knowing the premises and the rights secured to your orator as aforesaid, but contriving to injure your orator and to deprive him of the benefits and advantages which might and otherwise would accrue unto him from said invention, after the issuing of the letters patent as aforesaid and before the commencement of this suit, did, as your orator is in-
26 formed and believes, without the license or allowance and against the will of your orator and in violation of his rights and in infringement of the aforesaid letters patent, unlawfully and wrongfully, and in defiance of the rights of you orator, make, construct, and use the said invention, and did make, construct, use, and vend to others to be used, ovens made according to and employing and containing said inventions, and that they still continue so to do.

And your orator further shows unto your honors that said improvements described and claimed in said letters patent respectively, to wit, reissue No. 4026 and reissue No. 6397, are capable of being used in one and the same oven, and have been so made and used by the defendants herein, and that they have been so made and used as hereinbefore alleged by said defendants jointly within the said county of St. Louis, State of Missouri, since your orator has been the exclusive owner of all right, title and interest in said letters patent in and for the said county of St. Louis aforesaid, and still are being so used by defendants in said county, and in defiance of the rights acquired by and secured to your orator as aforesaid and to his great and irreparable loss and injury, and by which he has been and still is being deprived of great gains and profits which he might and otherwise would have obtained, but which have been received and enjoyed and are being received and enjoyed by the said defendants by and through their aforesaid unlawful acts and doings.

27 And your orator further shows unto your honors, on information and belief, that said defendants have made and sold large quantities of bread and crackers baked in said ovens and have a large quantity on hand which they are offering for sale, and have made and realized large profits and advantages therefrom, but to what extent and how much exactly your orator does not know and prays a discovery thereof; and your orator says that the use of the said invention by said defendants and their preparation for and avowed determination to continue the same and their other aforesaid unlawful acts, in disregard and defiance of the rights of your orator, have the effect to and do encourage and induce others to venture to infringe said patent in disregard of your orator's rights.

And your orator further shows unto your honors that he has caused notice to be given to said defendants of said infringements and of the rights of your orator in the premises and requested them to desist and refrain therefrom, but they have disregarded said notice and refused to desist from said infringements and still continue to make and use said ovens embracing said improvements.

And for as much as your orator can have no adequate relief except in this court, to the end that the defendants may be compelled to account for and pay over the income thus unlawfully derived from the violation of the rights of your orator as above and be restrained from any further violation of said rights, your orator prays that your honors may grant a writ of injunction restraining the defendants from any further
28 construction or sale or use in any manner of said patented ovens or any part thereof in violation of the rights of your orator as aforesaid, and that the ovens now in possession or use of the said defend-

ants may be destroyed or delivered up to your orator for that purpose, and also that your honors, upon the entering of a decree for infringement as above prayed for, may proceed to assess or cause to be assessed under your direction, in addition to the profits to be accounted for by the defendants as aforesaid, the damages your orator has sustained by reason of such infringement, and that your honors may increase the actual damages so assessed to a sum equal to three times the amount of such assessment under the circumstances of the willful and unjust infringement by said defendants as herein set forth. And your orator prays also for a provisional or preliminary injunction and for such other relief as the equity of the case may require and as to your honors may seem meet.

May it please your honors to grant unto your orator a writ of injunction conformable to the prayer of this bill and also a writ of subpœna of the United States of America directed to the said James Dozier, Augustus Weyl, Louis D. Dozier, and John T. Dozier, and the firm of Dozier, Weyl & Co., and commanding them to appear and answer unto this bill of complaint and to abide and perform such order and decree in the premises as to the court shall seem meet and be required by the principles of equity and good conscience.

JOS. GARNEAU,
HATCH AND PARKINSON,
Solicitors for Complainant.

HATCH and PARKINSON, *Counsel.*

29 UNITED STATES OF AMERICA,
Eastern District of Missouri, ss:

On this 15th day of September, 1875, before me personally appeared Joseph F. Garneau, the above-named complainant, who, being by me first duly sworn, deposes and says that he has read the foregoing bill of complaint subscribed by him, and knows the contents thereof, and that the same is true of his own knowledge, except as to the matters therein stated on information and belief, and as to those matters he believes it to be true.

M. M. PRICE, *Clerk*,
By A. P. SELBY, *D. C.*

Upon which supplemental bill there was issued the following subpœna in chancery, to wit:

Subpœna in chancery.

UNITED STATES OF AMERICA,
Eastern District of Missouri, sct:

In the circuit court of the United States in and for said district.

The President of the United States to James Dozier, Augustus Weyl, Louis D. Dozier, and John T. Dozier, and the firm of Dozier, Weyl & Co., greeting:

You are hereby commanded to be and appear at rules to be held at the office of the clerk of the circuit court of the United States in and for the eastern district of Missouri on the first Monday of November next, at the city of St. Louis, then and there to answer the supplemental bill of complaint of Joseph F. Garneau, a citizen of the State of Missouri, filed against you on the 6th day of September, 1875; hereof fail not.

Witness the honorable Morrison R. Waite, Chief Justice of the United States, the 14th day of September, 1875. Issued at office in the city of St. Louis, under the seal of said circuit court, the day and year last aforesaid.

[SEAL.]

M. M. PRICE, *Clerk*,
By A. P. SELBY, *Deputy*.

30 MEM.—The defendants to enter their appearance in this suit in the clerk's office on or before the day at which the writ is returnable; otherwise the bill may be taken pro confesso.

M. M. PRICE, *Clerk*,
By A. P. SELBY, *Deputy*.

And upon which subpœna in chancery there was endorsed the following marshal's return, to wit:

Marshal's return.

UNITED STATES OF AMERICA,
Eastern District of Missouri, sct:

Executed this writ by delivering a copy of the subpœna in chancery, together with a copy of the bill of complaint, to the within named Louis D. Dozier, at St. Louis, within the east. dist. of Mo., September 16th, 1875, and by delivering a copy of the subpœna in chancery to the within named Augustus Weyl September 16th, 1875, and by delivering a copy of the subpœna in chancery to the within named John T. Dozier, at St. Louis, within the eastern district of Missouri, September 28th, 1875, and by delivering a copy of the subpœna in chancery for the firm of Dozier, Weyl & Co. to Louis D. Dozier, at St. Louis, within the eastern district of Missouri, September 16th, 1875. The within named James Dozier could not be found.

C. A. NEWCOMB,
United States Marshal, Eastern District of Missouri,
By WM. H. BIERSTADT,
Deputy.

And afterwards, to wit, on September 15th, 1875, there was filed in the office of the clerk of said circuit court the following stipulation, to wit:

Stipulation.

Circuit court of U. S., E. Dist. Mo. In equity.

JOSEPH GARNEAU
vs.
DOZIER, WEYL AND CO. ET AL.

31 It is hereby agreed between counsel in the above entitled cause that the complainant shall have until and including the 20th day of Sept., 1875, in which to swear to the amended bill filed herein; the above stipulation not to prejudice the defendants in any objection or exception they may make to said amended bill.

HATCH AND PARKINSON,
For Complainant.
WOOD AND BOYD, *For Def'ts.*

And afterwards, to wit, on October 29th, 1875, the defendants entered their appearance to the supplemental bill, which is as follows, to wit:

Appearance.

United States circuit court, eastern district of Missouri.

JOSEPH F. GARNEAU
vs.
DOZIER, WEYL AND CO. ET AL.

Wood and Boyd, solicitors for the defendants, appear for them.
Dated Oct. 28th, 1875.

WOOD AND BOYD,
Sol's for Def'ts.

And afterwards, to wit, on December 2nd, the defendants filed their answer to the amended bill, which said answer is as follows, to wit:

Answer to amended bill of complaint.

Circuit court of the United States for the eastern district of Missouri.
In equity.

JOSEPH F. GARNEAU
vs.
DOZIER, WEYL & CO., JAMES DOZIER, Augustus Weyl, Louis D. Dozier, and John T. Dozier. — No. 560.

Answer to amended bill.

The joint and several answer of James Dozier, Augustus Weyl, Louis D. Dozier, and John T. Dozier, partners under the firm-name of Dozier, Weyl & Co., defendants, to the amended and substituted bill of complaint of Joseph F. Garneau, complainant.

32 These defendants now, and at all times hereafter, saving and reserving to themselves all and all manner of benefit and advantage of exception that may be had or taken to the manifold errors, uncertainties, and insufficiencies of said amended and substituted bill of complaint, for answer thereto, or to so much and such parts thereof as they are advised it is material or necessary for them to make answer unto, answering, say:

That, as part of their answer to said amended or substituted bill, they refile their answer heretofore filed in answer to the original bill herein, and pray the same benefit therefrom as if the same had been made in answer to this bill.

And the defendants, further answering, admit that reissued letters patent No. 4026 were granted to said Hosea Ball June 14th, 1870, but whether the surrender upon which said reissue was granted was made with the consent and acquiescence of said complainant, or in accordance with law, respondents have no information or knowledge, save by said amended bill, and therefore leave the complainant to make such proof of the fact as he may be advised.

Respondents also admit that a certificate of the extension of said reissued letters patent was issued by the Commissioner of Patents, as alleged, but whether said Hosea Ball complied with the requirements of law in his application for said extension these respondents are not in

formed save by said amended bill, and they, therefore, leave complainant to make such proof as he may be advised; but respondents deny that said Hosea Ball was the original and first inventor or discoverer of the alleged improvements claimed in said reissue No. 4026, or
33 any substantial or material part thereof.

And these defendants, further answering, on information and belief, deny that said original patent and reissue No. 3666 were, or that either of them was surrendered to the Commissioner of Patents for good and lawful cause, and say that said surrenders were made for other and different causes than those for which letters patent could be lawfully surrendered, and among other things were made to obtain, and that said Ball did obtain, contrary to the provisions of the statute in such case made and provided, said reissue No. 4026 for more and other matters and things than those of which he was the original and first inventor, and more than were described or included in the specification attached to said original patent granted to him or shown in the drawing attached thereto, or in the model forming part of the application for said patent, and that said last named reissue is not for the same invention for which said original patent was issued to said Ball.

And respondents further say that in view of the state of the art at the date of the alleged invention by said Ball, said reissue No. 4026 is void, as the production of the devices therein shown did not involve the exercise of any invention or discovery.

And that defendants, further answering, on information and belief say that heretofore, and on or about the eleventh day of October, 1872, said Hosea Ball filed a bill of complaint against John Bailie in the circuit court of the United States for the southern district of Ohio,
34 being case No. 1672, and another bill against Y. K. Withington & Co., being case No. 1671, in each of which bills it was alleged that the defendants therein had infringed said reissued letters patent No. 4026 by the use of bakeovens substantially like those used by these respondents; that the defendants in said suits appeared, and by their answer put in issue the validity of said last named reissue; that at the October term, 1873, of said court for the southern district of Ohio said causes were brought to a final hearing on the pleadings and proofs, after which an opinion was delivered by the court declaring said reissue to be void, and decrees were entered dismissing each of said bills; that subsequently rehearings were granted in said cases, and rehearings had at the October term, 1874, when the former findings and decrees of the court were affirmed, all of which will more fully and at large appear by reference to the proceedings in said causes, to which these defendants beg leave to refer and to introduce as part of their defence hereto.

Wherefore these defendants pray as in and by their former answer they have heretofore prayed.

WOOD & BOYD,
Respondents' Solicitors.

UNITED STATES OF AMERICA,
Eastern District of Missouri, ss:

Louis D. Dozier, one of the defendants, being duly sworn, deposeth and says that he has read the foregoing answer signed by him, and knows the contents thereof, and that the same is true of his own knowledge, except as to those matters which are therein stated on information and belief, and as to those matters he believes it to be true.

LEWIS D. DOZIER,
For Self & other Defendants.

35 Subscribed and sworn to before me this 2nd day of Dec., 1875.
M. M. PRICE,
Clerk,
By A. P. SELBY,
Deputy.

And afterwards, to wit, on December 6th, 1875, the complainant filed his reply to the answer of defendants to the amended bill herein, which said reply is as follows, to wit:

Replication.

Circuit court of the United States for the eastern district of Missouri.
In equity.

JOSEPH F. GARNEAU
vs.
DOZIER, WEYL & CO. ET AL.

The replication of the above-named complainant to the answer of the above-named defendant to the amended bill herein:

This repliant, saving and reserving to himself now and at all times hereafter, all and all manner of benefit and advantage of exception which may be had or taken to the manifold insufficiencies of said answer, for replication thereunto says that he will aver, maintain, and prove his bill of complaint to be true, certain and sufficient in law to be answered unto; and that the answer of the said defendant is uncertain, untrue, and insufficient to be replied unto by this repliant; without this, that any other matter or thing whatsoever in the said answer contained material or effectual in the law to be replied unto, and not herein and hereby well and sufficiently replied unto, confessed and avoided, traversed or denied, is true; all which matters and things this repliant avers and will be ready to aver, maintain, and prove as this hon-
36 orable court shall direct, and humbly prays as in and by his said bill he has already prayed.

HATCH AND PARKINSON,
Solicitors for Complainants.

And afterwards, to wit, on November 29th, 1876, there was filed in the office of the clerk of said circuit court the following supplemental answer to the amended bill of complainants, to wit:

Supplemental answer.

Circuit court of the United States for the eastern district of Missouri.
In equity.

JOSEPH F. GARNEAU
vs.
DOZIER, WEYL & CO. ET AL. — No. 560.

Supplemental answer.

The supplemental answer of James Dozier, Augustus Weyl, John F. Dozier, and Louis D. Dozier, defendants, to the amended and supplemental bill of complaint of Joseph F. Garneau, complainant.

These defendants, by leave of the court first had and obtained, re-

serving all benefit of exception to said amended and supplemental bill as before reserved, by way of further defence thereto, say, on information and belief, that prior to the alleged invention of said Duncan McKenzie the improvements claimed in said reissue No. 6397 were publicly used at Ware, Hampshire County, Massachusetts, by George C. Jennison, formerly of that place, but now of Philadelphia, Pennsylvania, which use is also known to George Root and Leander Hilton, of said town of Ware, and to many others.

Wherefore the defendants pray as in and by their original answer they have heretofore prayed.

WOOD AND BOYD,
Solicitors for Respondents

Endorsement.

37 We consent to an order allowing this answer to be filed without oath.

HATCH AND PARKINSON,
For Compl't.

NOV. 21st, 1876.

And afterwards, to wit, on February 5th, 1877, there was filed the following stipulation, to wit:

Stipulation.

U. S. circuit court, eastern district of Missouri. In equity.

JOSEPH F. GARNEAU
vs.
JAMES DOZIER ET AL. } No. 560.

It is stipulated between the parties hereto that the respondents may offer in evidence at the hearing a certified copy of the original letters patent No. 28130, referred to in the bill as having been granted to Mary Ann Elizabeth McKenzie May 1st, 1860, together with a certified duplicate of the model filed in the Patent Office as part of the application for said patent, subject to exceptions for relevancy and competency.

HATCH AND PARKINSON,
Solicitors & of C'l for Comp't.
WOOD AND BOYD,
Solicitors & of C'l for Respondents.

And afterwards, to wit, on April 3rd, 1877, at the regular March term of the circuit court of the United States for the eastern district, begun and holden in said district on Monday, March 18th, 1877, the following further proceedings were had in said cause, to wit:

Final decree.

JOSEPH F. GARNEAU, COMPLAINANT,
vs.
JAMES DOZIER, AUGUSTUS WEYL, LOUIS D. Dozier, & John T. Dozier, defendants. } No. 560.

38 This suit having been brought to final hearing upon the pleadings and proofs, and counsel respectively having been heard

thereon, and the same having been duly considered by the court, it is found that the equity of the case is with the defendants, and that the complainant is not entitled to the relief asked in the bill of complaint herein, or to any relief, and it is hereby ordered, adjudged, and decreed that the said bill of complaint do stand dismissed out of this court with costs to be paid by the complainant to the defendant, and leave is given defendants to move for an increase of costs.

And afterwards, to wit, on April 10th, 1877, the following further proceedings were had in said cause, to wit:

Motion to tax certain costs overruled.

JOSEPH GARNEAU, COMPLAINANT, *vs.* JAMES DOZIER ET AL., DEFENDANTS. } No. 560.

This day come the said parties, by their solicitors, and the motion of the defendants to tax certain costs is submitted to the court; on consideration thereof it is ordered that said motion be, and the same is hereby, overruled.

And afterwards, to wit, on April 11th, 1877, the following further proceedings were had in said cause, to wit:

Appeal allowed; appeal bond filed and approved. Transcript to U. S. Sup. C't ordered.

JOSEPH GARNEAU, COMPLAINANT, *vs.* JAMES DOZIER ET AL., DEFENDANTS. } No. 560.

This day comes the complainant, by his solicitors, and on motion it is ordered that an appeal be granted herein from the decree of this court to the Supreme Court of the United States, and thereupon the
39 said complainant presents to the court an appeal-bond, which is approved and ordered to be filed.

It is further ordered that the clerk of this court make out and certify to said Supreme Court a full and complete transcript of the record and proceedings herein.

Which said appeal bond is in the words and figures following, to wit:

Bond.

Know all men by these presents, that we, Joseph Garneau, Joseph O'Neill, R. W. Powell, are held and firmly bound unto Dozier, Weyl & Co., James Dozier, Augustus Weyl, Louis D. Dozier, and John T. Dozier, of the city and county of St. Louis, State of Missouri, in the full and just sum of one thousand dollars, to be paid to the said Dozier, Weyl & Co., James Dozier, Augustus Weyl, Louis D. Dozier, and John T. Dozier, their heirs, executors, administrators or assigns, to which payment, well and truly to be made, we bind ourselves, our heirs, executors and administrators, jointly and severally, by these presents, sealed with our seals, and dated this tenth day of April, in the year of our Lord one thousand eight hundred and seventy-seven.

Whereas lately, at the March term, 1877, of the circuit court of the

United States for the eastern district of Missouri, in a suit depending in said court between Joseph F. Garneau, of said St. Louis, plaintiff, and said Dozier, Weyl & Co., James Dozier, Augustus Weyl, Lewis D. Dozier, and John T. Dozier, judgment was rendered against the said Joseph F. Garneau, and the said Joseph F. Garneau having ob-
40 tained an appeal from the judgment of said court to the Supreme Court of the United States of the said court to reverse the judgment in the aforesaid suit, and a citation directed to the said Dozier, Weyl & Co., James Dozier, Augustus Weyl, Louis D. Dozier, and John T. Dozier, citing and admonishing them to be and appear at a Supreme Court of the United States to be holden at Washington the second Monday of October next:

Now, the condition of the above obligation is such that if the said Joseph F. Garneau shall prosecute said writ to effect, and answer all damages and costs if we fail to make good his plea, then the above obligation to be void; else to remain in full force and virtue.

JOS. GARNEAU. [SEAL.]
JOSEPH O'NEIL. [SEAL.]
R. W. POWELL. [SEAL.]

Sealed and delivered in presence of—

Approved by—

SAMUEL TREAT,
Judge.

STATE OF MISSOURI,
City and County of St. Louis, ss:

Be it remembered that on this 11th day of April, A. D. 1877, before me the undersigned, a notary public within and for the city and county and State aforesaid, who duly qualified as such May 31st, 1876, for a term expiring May 31st, 1882, appeared Joseph Garneau, Joseph O'Neil, and R. W. Powell, who are personally known to me to be the same persons whose names are subscribed to the within instrument of writing as parties thereto, and acknowledge the same to be their act and deed for the purposes therein mentioned.

In testimony whereof I have hereunto set my hand and affixed my notarial seal at office, in the city of St. Louis, Mo., the day and year first above written.

[SEAL.] THOS. P. GLEESON,
Notary Public, City and County of St. Louis, State of Mo.

41 DEPOSITIONS FOR COMPLAINANT.

DUNCAN MCKENZIE, a witness produced on behalf of the complainant, being first duly sworn, deposeth and saith in answer to interrogatories propounded to him by Robt. H. Parkinson, esq., of counsel for the complainant, as follows:

Question 1. State your name, age, residence, and occupation.

Answer. Duncan McKenzie; residence, Brooklyn, N. Y.; age, 52 years; occupation, oven builder.

Q. 2. Please look at complainant's exhibit, McKenzie reissue, being reissue No. 6397, granted and marked McKenzie, for improvement in bakers' ovens, April 20th, 1875, and state whether or not you are the patentee of said letters patent.

A. I am.

Q. 3. Please state what experience you have had in constructing or operating bake ovens, also please give so far as you can the history of your invention of the improvements described and claimed in said reissue.

A. I have been an oven builder for 33 years and better; my first experience. I have been a builder of what was known as the old-fashioned tyle oven, heated by coal or wood; in 1855 I contracted through a carpenter in Brooklyn to do some masonry out in a country residence on Long Island, N. Y.; the owner of the building was Hyram Berdan. I became quite intimate with him some time subsequent to that; shortly after that he told me that he was going to construct a large bakery in Brooklyn and bake with a mechanical oven, an invention of his own.

The glowing description that he gave of the oven he calculated to
42 build, that all the bakers would be compelled to take bread from him in place of baking it themselves. My curiosity got excited, as all the ovens that I was acquainted with or had any knowledge of was the old-fashioned tyle oven, with some certain improvements, such as underheaters and the like of that, which had come out about that time in the said oven. I was anxious to get the contract for the work of building the Berdan oven, and I believe I would have got it, but a few weeks before the time I was taken down with typhoid fever, Sept., 1856. I was not able to look after the job and did not get it, owing to sickness. He started that bakery within three hundred yards of my house; after I was able to get around and to walk out they were building the oven; when the weather was good I would generally walk down to the bakery; being acquainted with Berdan, I had the freedom of the bake-house. I saw the oven as it progressed; my mind was more on the way of heating and the general construction of the oven. After they got to work baking, I watched it very closely and saw that, although it was a fine piece of mechanism, it consumed a vast amount of fuel and was expensive to run. The oven was constructed with furnaces and a huge combustion chamber in the cellar of the building; the baking-chamber, above the combustion-chamber, was, I should think, 20 or 30 feet high, a large, square stack; the combustion-chamber and oven were separate; there

was an arch over the combustion-chamber; the oven was heated
43 from pipes lined with fire-bricks, similar to a cylinder stove; these pipes passed down through the arch, I guess about flush with the under side of the arch; these pipes run the whole way up through the baking-chamber, and communicated with flues that led direct to the chimney. The oven was heated from these pipes and the arch by heat radiating therefrom. In the cellar, I forgot the number of furnace doors, but it was an enormous fire; these doors all fed into the same furnace; while examining the baking of that oven and the working of it, the idea suggested itself to me that an oven of that kind could be improved in the method of heating, and that a furnace could be constructed to bake with the direct contact of the products of construction. But I encountered one great difficulty that I had to overcome before I could bring that to perfection; that difficulty was combustion; to support combustion, there was but two ways known that I was aware of; that was draught by a chimney or artificial draught by a blower, either of which could not be used to bake with, as a draught would carry heat and other products with it; an oven could be heated and had to be heated by draught to support combustion. This was something new that I had never heard of—this idea of mine; I had never read anything about it.

I found no one that could help me with it, to solve that problem.
44 I went and constructed on my own premises a brick oven to exper-

iment with; that was in 1857. While experimenting with that oven I watched it thoroughly and sat up with it, and even employed a baker to make bread; then I found out or discovered, after a fire was thoroughly kindled and an oven heated, that the quicker wet bread passed in and out of an oven it formed a partial vacuum; as the wet bread took up the heat, forming this partial vacuum, the heat rushed in and filled up the space, and by passing the bread in and out it would form a continuous baker; but a common oven was not suitable for such a plan as that; it required some mechanical movements to bring it out thoroughly or demonstrate thoroughly what the idea was; at the time all the mechanical movements that I knew in an oven was that which I knew in the Berdan oven—an endless chain carrying a series of platforms up and down the ovens. That was in 1857; some time in the latter part of '57 or shortly after the financial crysis, there was a note of mine passed into the hands of Rob't G. Anderson; he was one of the firm of R. G. & Peter B. Anderson, 219 Fulton st., cracker bakers; some time about then or a little after, Rob't G. Anderson retired from the firm and Peter B. Anderson, his brother, bought him out and continued the business; Robert G. Anderson formed a partnership with Hosea Ball. I went to the bake house the latter part of 1857, to get an extension of time on the note that had passed into Anderson's hands; while there Peter B. Anderson invited me into the bake house
45 to see his new patented oven; that was the first reel-oven that I ever saw. I appreciated the advantages of the reel oven over the endless chain, as the stuff could be fed in and taken out by the one door, and occupied but a small space compared with the Berdan oven. When I saw it I said, "My God, that's what I want." The oven was constructed by Hosea Ball, patented Sept. 23rd, 1856. Shortly after that, whether before New Years or after it, in '57 or '58, the arch over the combustion chamber in Anderson's bakery fell down. He sent for me. Somehow or other I couldn't go myself. I went to another man and sent him. The man I sent had been all day and all night putting the arch in, drawing the center that was formed to turn the arch on; in the morning the arch fell. Anderson sent for me to come individually and put in the arch. I went and put in the arch. The arch was arched over a combustion chamber about 8 by 12 feet, an oblong chamber under the bakery chamber. There was some miscalculations in the laying out that arch; they started the spring of their arch too high, only giving the arch about six inches of rise. It was impossible to give it any more, as it came in contact with the reel passing round or revolving. While I was in the oven I had ample opportunity, and I embraced it, to examine thoroughly the whole construction of the interior of the oven. The oven was constructed with a furnace run parallel with the front of the oven. The furnace door was placed on one side of the oven; near the front it was a large
46 fire chamber or heating chamber; the products of combustion spread over that huge chamber; the chamber was about as large as the dimensions before given in describing the oven, the same arched chamber; this chamber, from the furnace to the under side of the arch, was about three feet high. Under the arch there was a series of springs about four courses deep, four inches wide on the two sides and rear of the combustion chamber under the arch. These flues communicated with an open space or chamber, and described by Ball as an exterior chamber or flue. The products of combustion from the combustion chamber entered this chamber and communicated direct with the chimney. The draught of the furnace was regulated with a damper over said exterior flue. Four feet above the top of the arch in the four-inch wall on the

two sides and the rear there were openings or apertures all round the sides and rear. Those openings communicated with the interior chamber. In the said baking chamber was arranged a rotating reel with areas or spokes carrying 8 grain pans. After finishing that arch, and in conversation with Mr. Anderson, I told him that it was impossible for that arch to stand long; it would come down, owing to the unequal contraction & expantion, and the arch not having rise enough. I told Anderson that I could make the arch stay up if he would let me have my way of it the next time she came down. Some time about that time, early in '58, Ball, Knapp, & Co. made arrangements to have some loaf-bread baked there in that oven; they got all ready with a large batch; the
47 oven baked their bread, but it took them about half a day nursing it before they could get it ready to bake loaf-bread. The bread turned over well; it was good bread; but they found out that they hadn't bottom heat enough for loaf-bread. They had all the top they wanted and more so, but the bottom was slack-baked. They wanted to get more bottom heat. I told Mr. Anderson that I could give it the bottom if they would let me construct their furnace the way I wanted to; I would give them all the bottom they wanted. I think very early in the same year the arch came down again. I told Mr. Anderson I would charge him nothing for my time; that I would put the arch in; that it would stand. He told me to do it any way I had a mind. I put probably a dozen or more holes right in the arch over the fire-box, about three-inch holes. When it was finished I showed it to Mr. Anderson and he was very much frightened, and wanted me to close them up again. I begged him to let them remain, as he was afraid that the dust would pass right into the baking chamber. I persuaded him to let them remain, and that if they did not work I would close them up, and there was no danger as to the direct draught, or the heavy products from the furnace would pass, as they had done before, through the lower opening to the exterior chamber and the chimney. It made a wonderful improvement in the baking and working of the oven. He was so well pleased with it that some time in the early part of the summer or spring of 1858 he got me to go in and put more holes
48 in it. I ought to have stated prior to that, after thoroughly understanding that construction of the Ball oven, I had a plan drawn showing my principle or invention, showing and describing my invention as subsequently patented. About that time I went into the oven again. I reconstructed it as far as the original building of the oven would allow. I had a direct draught and an indirect draught put in; that is, a damper placed on the top or crown of the oven communicating with the flue to the chimney suitable for a direct draught through the baking chamber from the furnace. I had another one placed in the rear of the oven, communicating with a flue that I ran up in the back wall of the oven to the chimney. In the front of this oven, where I ought to have had the furnace door placed, his engine stood. I had to use the same place to fire-up as was originally put in by Ball. I put an arching similar to the arch that was in, but having filled up these holes that communicated with the interior chamber, I was able to build an additional piece of a wall along the two sides of the oven up against these holes that I had closed up, which gave me a solid foundation or spring to throw this arch from side to side. In that arch, along both sides and in the rear, I left a number of good-sized holes or openings, and bricked up all the apertures that were around the two sides and rear of the baking chamber that communicated with the ex-
49 terior chamber. That improvement that I put in enabled them to

bake continually, and dispensed with the treadle for hoisting the door and stopping to heat up.

Some time in the summer of 1858 Ball, Knapp and Co. opened a store in Broadway, N. Y. City. They sent for me, as they had been informed by Anderson of the improvements that I had made in the oven and what I said I could do, and wanted me to explain what alterations I had made in order to improve its working. I then made known to them my intention, and to make it more clear I had a plan made showing my invention in full. They all seemed very much pleased with it and offered to make arrangements to have me build all their ovens and to give me an interest, but I was anxious to use their reel, as this interest that they offered me was only the work of building the ovens, and at that time they contemplated when the time came round that the American Institute fair was going to be held that year in the Crystal Palace and they would put up an oven there and get me to build it and put in my improvements. They kept me running after them most all that summer from time to time, as they calculated to get ovens to build.

In the summer of 1858, as that store they had opened in 177 Broadway was for all kind of bakers' machinery and ovens, I was mostly there daily. For about two months I run after them, and when the time came round to build the oven in the Crystal Palace Mr. Ball was afraid to adopt my plan in the Crystal Palace oven and went and built one himself. Whether he adopted any of my plans or not I don't
50 know, because before they got to work, a day or two after it opened, the Crystal Palace was destroyed by fire. That ended me with Ball and Knapp, and ended the Ball and Knapp Co. too.

My next job I got at reel ovens was the said Anderson oven. He wanted to increase his baking capacity and put another pan and make his pans longer. I dug out what I had bricked up and used the room that was formerly occupied by these flues, as they were built by Hosea Ball, giving additional room for pans about a foot longer and adding one pan more, making a nine pan oven. These pans were seven feet long before; after the alteration I put in eight feet pans. They removed the engine from the front of the oven, so I was able to put the furnace in front in place of the side, as it was formerly. As it was built in 1859, it is still in use, or was till a short time ago, from that time to the present. I had great trouble to get any one to adopt the oven, as Iverson W. Knapp became the owner of the Ball oven, and threatened any one that he would prosecute them for using the reel, as we all thought Ball was the inventor of the reel. I had delayed getting a patent on my invention, as I wanted to use the reel. I could enter into no arrangements with Knapp, except I would give it to him all. I had a model *model* made that winter, '59 or '60; made application some time in the latter part of the winter through Munn & Co.; received a patent on it dated May 1st, 1860. I tried every baker in the city of New York after
51 I got the patent to let me put up an oven. They were all afraid of the gasses entering the baking chamber, as it was a new departure, and were afraid of Knapp, as they believed that Ball was the original inventor of the reel. I done nothing with it that year; lost the whole year. and I might say the two years before it.

In 1861 D. B. Fuller came after me to see if I would construct an oven for him according to the patent and he would pay me so much a day and my expenses to go to Buffalo and back, as he had taken legal advice about the validity of the Ball and McKenzie patent and was satisfied through the said advice that they were two distinct inventions. The Anderson oven and this oven I constructed for Fuller created quite

a revolution in the trade as far as baking was concerned. From that on & to about 1870 I had constructed something like about 200 reel ovens over the United States; had sold iron work for ovens and plans for constructing them to several foreign countries. One went to France, one Australia, two or three to South America. They are now in use in all the principal bakeries in the United States and there are three now in use in Russia.

Q. 4. Please state as nearly as you can the date when you first introduced the direct connection between the leaking chamber and the furnace into the Anderson oven, and state also how you fix the date.

Ans. It was in the latter part of the spring or early in the summer of 1858. I had early in March, 1858, drawings made out showing
52 the plans of a reel oven. I can fix the date of that by some of the drawings I have still in my possession. As I was informed that Ball was the inventor of the reel, I was in the search to see if I could find any other mechanical movement suitable for changing bread in an oven or carrying the bread through an oven. I was informed early in the year of 1858 that there was a new kind of an oven built and in use in Washington street, New York. It was called a French oven; there was a Frenchman baking in it. I went and saw it, got the privilege to look all around it, and the gentleman explained it to me so that I got a thorough knowledge of the way in which it was constructed. I made a sketch of it and then I had a practical draughtsman make a drawing of it for me. That drawing I have had in my possession since March 3rd, 1858. I had it witnessed at the time and certified by two men of high standing living in the city of Brooklyn yet. At the same time that this drawing was made, or after this was finished, he made another for me, making two, showing the reel oven the same as I subsequently had it patented. I had that same drawing in my possession till, I think, it was 1872; I think in January, 1872, it was used in testimony in the suit of Hosea Ball against Thomas Harris, John T. Wilson & Co., Fuller Brothers, and others, Brinkerhof & Co—I think there were some others—in the United States circuit court for the southern district of New York. The plan that was used in my testimony was put in as an exhibit at the time of taking testimony.
53 That plan has been hunted for everywhere; we can't find it in the court, and last week I was at Gifford's, Ball's attorney, and it could be found. In 1857 I gave a note to a stonecutter in Brooklyn, by the name of Mathew Johnson; the said Matthew Johnson was a brother-in-law of Anderson. Robt. G. Anderson cashed the note for Mr. Johnson about the time that the note came due. There was the crisis of the panic of '57. I was not able to meet the note. I went to see Anderson in his bakery to get an extension of time. He gave it to me, and that was the time that he invited me in to see the new oven.

Q. 5. Please produce the drawing first referred to in your last answer.

(The drawing is produced and marked Complainant's Exhibit, McKenzie Drawing.—ARTHUR KERN, *Notary Public.*)

Q. 6. Is this drawing, "Exhibit McKenzie drawing," a correct sketch of the French oven which you saw in New York, or is it different from that oven in some respects?

A. It is different.

Q. 7. In what respect different?

A. The French oven was heated by radiated heat from an iron furnace box with pipes running from this box into flues in the side wall, and went up straight and communicated with the chimney. This was drawn

to heat or bake by the direct contact of the hot air or heated products. The movement in here I calculated to use for placing bread pans on for baking bread. I never put it into practice.

Q. 8. What do the squares marked with a cross or X, in figure 3 of this drawing, represent?

54 Ans. They represent a communication from the furnace, under the bread, and up through the oven through the baking chamber.

Q 9. At what time, with reference to the making of this drawing, did you have the drawing, showing the reel to which you have referred, made?

A. It must have been the same time or about the same time, as the gentleman who made them informed me within two weeks that he made two plans for me at that time.

(Objected to as hearsay.)

Q. 10. Can you state from your own memory whether those drawings were made at the same time or some months or more apart?

(Objected to.)

A. They were both made at the one time, one after the other. I paid him for them both at the one time in the one payment. The payment for the two was all the payment I ever remember of making him.

Q. 11. How did the means of heating the baking chamber, shown in the drawing which had the reel, compare with or differ from that shown in this Exhibit McKenzie drawing?

(Objected to.)

Ans. They were the same in principle, but the mode was a little different in the construction of the oven.

Q. 12. What was the difference in the construction?

A. The one was calculated to carry bread pans in a circular movement similar to the plan of a wheel laying flat.

Q. 13. What means did this drawing having the reel show for

55 heating the oven, if any?

(Objected to.)

Ans. The means was the same in both ovens, but owing to the difference of construction of a circular and square chamber there was some difference only in the construction of the brick-work of the ovens.

Q. 14. Describe what that difference of construction was so far as it related to the means of heating the baking chamber.

Ans. There wasn't much difference; in fact, you might call them the same, I think. I calculated two little furnaces, on a similar plan as exhibited on the reel oven, owing to a foundation that I had in the middle of the chamber; a furnace door was at each side opposite one another, both communicating to the same chamber, when the damper was open, for the one damper regulated both furnaces.

Q. 15. Will you now state, without reference to the drawing before you, just what means, if any, of heating the baking chamber was shown in the drawing of the reel-oven to which you have referred as being made about the same time as the Exhibit McKenzie drawing?

(Objected to.)

A. There were two furnaces parallel with one another. There might have been about 18 inches between them. Each of the furnaces was about two (2) feet wide, three (3) feet deep; the back of the furnace was about two courses higher above the grate bars, to protect the coal from being thrown too far back. The same furnace or chamber behind

56 the grate bars continued to the rear of the oven, forming a combustion chamber or fire chamber. Two courses above the grate bars there was laid off four inches from the front of the grate bars there

were four inch flues, four inches wide and three courses deep. These flues were laid off from the front to the rear, nine inches apart, both sides facing the two side walls. The sides of the furnaces were about two feet from the side walls. These flues was laid off at about an angle of 45°, and came through the floor about twelve inches long and four and a half (4½) wide, direct through the floor. Between the two furnaces in the middle I had flue and damper; the flue dipped down and was carried horizontal, and dipped into the pit of the oven. The pit communicated through a flue in the back wall with the main chimney. In the top or crown of the oven was an opening with a damper and frame placed over it; a flue over the top of the oven communicated with the main chimney; when the fires were kindled in the furnace, the top damper was open; smoke and gases all passed direct to the top damper; when the oven was heated and the fires thoroughly going, ready to commence baking, the top damper was closed, the bottom one opened, or partly opened, when the heat or products of combustion would rise from that system of side flues to the top of the oven, settle and rotate, diffuse their heat all over the baking-chamber, by which means a continuous baking was able to be kept up all day or during the working hours.

Q. 16. Were or were not the features of the oven and furnace
57 described in your last answer shown in the drawing to which the last question referred?

(Objected to.)

A. Yes.

Q. 17. When was the date "March 3," 1858, written upon this exhibit "McKenzie drawing"?

Ans. The third day of March, 1858; the drawing might be made a few days before it.

Q. 18. When was the other writing upon this exhibit placed there?

A. At the same time, March 3rd, 1858.

Q. 19. Who wrote the names of David Fithiam and Samuel W. Osborn upon this exhibit?

Ans. David Fithiam and Samuel W. Osborn, both residents of the neighborhood that I live in, and are living there yet.

Q. 20. State the name and residence of the person who made these two drawings you have referred to.

Ans. David Paton; residence, 143 Monroe street, Brookly.

Q. 21. State the name of some person or persons who are acquainted with the first alterations you made in the Anderson oven and the subsequent alterations during the year 1858.

Ans. Peter B. Anderson, jr.; residence, Elliot Place, Brooklyn; place of business, the Old Dominion Steamship Co., 197 Greenwich street, N. Y. I have others, but I can't give their residence. Mr. Thos. Walsh and Mr. Andrew A. Boyd.

Q. 22. Are you acquainted with James Hall, formerly of Cincinnati, and patentee of what is known as the Hall oven?

Ans. Yes, sir.

Q. 23. Was he ever in your employ?

58 Ans. Yes, sir.

Q. 24. Where and in what capacity?

A. I did not pay him; he was working for me in Samuel Clomis' bakery in Cincinnati, in Jan'a'y, 1862.

Q. 25. What kind of work was he doing?

A. Brick work.

Q. 26. What was he building?

A. He was employed by the owner to help me build the oven.

Q. 27. Did he ever help you build more than one oven?

A. Yes, sir.

Q. 28. How many?

A. Two more, in Cincinnati. I was not present myself, but had my representative and recommended him; one of them he built as representation for me. I supplied him with all the working drawings necessary to build the said oven. The other he worked on under the superintendence of one of my men named John Rayney.

Q. 29. What kind of ovens were these?

Ans. What is known as the McKenzie reel oven.

Q. 30. How did they correspond with those shown in the patent here in suit, the McKenzie reissued patent?

A. The same as shown and described in the letters patent, with more openings, as the ovens were larger.

Q. 31. In the deposition of James Hall, I find the following statement: "In 1862, when McKenzie was putting up the first reel oven, in this city, I suggested to him to leave the corner off the furnace and have a
59 fire in the bottom of the oven. McKenzie said, 'Good God, Jimmy, you would burn all the iron up in the oven.' I said, 'You did not want to burn the iron but only to bake dough.' He said that when I live to be as old as him that I would know something." Did you ever use the words there attributed to you or make any statement of like effect to James Hall?

Ans. No, sir; I have no recollection of no such words, and for the reason I could not, which I shall explain: The oven that I constructed for Samuel Clumis was to bake army bread during the war. The whole bottom was laid off so that all over the bottom was communication from the furnaces, except about three feet over the grate. The fuel that they used to heat the Clumis oven was gas-house coke, very destructive on fire brick. The furnace, the arch over the furnace, wanted repairing, wanted a new arch. I was sent for, or I was in the city some way or other; I forget now. James Hall was to repair it. We went together to find fire brick; owing to the war going on at the time, fire brick were very scarce in the market. Whether Hall and I went together or he went himself, I forgot which, but we found a tile. The tile were something over two feet in length, about nine (9) inches wide, more or less, and about (3) three inches thick. These tile were made in a part of a circle; they might have had about six inches of a rise in the two feet over the first three feet over the grate bars; we put them close up for about ten feet from the back of the grate bars over the combustion chamber.
60 We placed them about four inches apart, four or five, constituting what I should call an open furnace, as these openings were two feet in length, probably two feet two inches by four or five inches wide or apart. The object of putting them on was to distribute the heat equally. James Hall set the tiles on. That was all the open fire I ever remember our talking about. I might have said it was an open fire, but I don't recollect any conversation about it. We were satisfied with it. I am not aware of the oven being repaired after that during the time the Clumis' run it. I had three other ovens built under my patent in Cincinnati, but Hall was not with me. One of them was this same Clume oven, making the second one built under my patent for P. K. Withington.

Q. 32. I now show you a letter and ask you, if you ever received such a letter, whether you know the handwriting and whether you know the signature attached to it?

Ans. Yes, sir.

Q. 33. Please state about when you received it with reference to the date it bears, whose handwriting it is in, and whose signature it bears.

(The two preceding questions objected to.)

Ans. It must have been a few days after it was written; it is the same hand as Jim Hall's usual correspondence, and it is his signature and James Hall's letter.

(The letter above referred to is here offered in evidence, and marked Complainant's Exhibit Hall Letter.)

61 (Repondent's counsel objects to the introduction of said exhibit.)

34. Please state whether or not the James Hall, to which you refer in your last answer, is the same as the one to which you have before referred in this deposition.

Ans. Yes; that is the same Hall.

Q. 35. Please state if you knew what kind of an oven the Clumis oven referred to in this letter was.

Ans. It was the second oven built for Cluner in Cincinnati; it was an eight pan single furnace, built by James Hall with plans supplied by me.

Q. 36. How did it compare with the oven described in the McKenzie reissue here sued upon?

Ans. The same; they were all the same except they were different sizes; this was a small one, an eight pan oven.

Cross-examination:

X Q. 37. Describe the construction of the oven which you say you built at your own place in 1857.

A. It was similar to an ordinary brick oven, with the exception that the crown and side walls were built something higher.

X Q. 38. By crown, do you mean the top of the oven?

A. Yes, the top of the oven; arch the usual arch.

X Q. 39. By ordinary oven you mean an old fashioned oven, in which the fire was drawn before introducing the material to be baked, do you not?

Ans. No; I mean the old fashioned tyle oven with a coal fire
62 in one corner; I had adopted something new in the ash pit below the furnace bars in the back wall of the ash pit; I connected a flue, formed a hole that connected with a flue in the side wall, in which I put a damper; I made a hole in the back part of the ash pit below the grates, forming a flue or a draft connected with the chimney flue, placed a damper on it to work from the outside of the wall with a handle; on the outside of this ash pit I had an air tight door placed; when I closed this door and opened the damper, I created a downward draught through the coal. The oven between that draught, in changing and experimenting with it, I found out that by placing wet bread in the oven; I sometimes placed it on a pile a brick to throw it above what was originally the floor of the oven, in one part of the oven and another, sometimes higher and sometimes lower; with these experiments, I was satisfied that I could construct an oven to make a continuous baking with coal, so that the baking could be kept going continuously, and combustion supported while baking, without the aid of the chimney after the fire was thoroughly kindled; and I found out with this draught that I could free the coal from sulphur, and was able to make a downward draught in any place I wanted to put it.

(All except the first part of the answer objected to by counsel for defendants, as not responsive.)

X Q. 40. Now, will you please state briefly what you considered the new features in this oven?

Ans. It was experimenting for to produce a continuous baker
63 to bake, with the direct contact of the heat from a coal fire without the aid of natural draught or artificial draught. While experimenting I became convinced that I had found what I wanted.

X Q. 41. Will you please answer my last question?

Ans. The features that I wanted to make the thing perfect was some kind of a bread carrier that would change the bread from one position to another in the baking chamber.

X Q. 42. I have not asked you anything about what you wanted, nor as to the object of your experiment; but have simply asked you to state briefly what you considered the new features in that oven; will you answer this?

A. I will; if I understand the thing right, a continuous burning of coal without shutting off the draught before bread could go into it, as the usual process of baking, or the bread being covered with soot or ashes while baking.

X Q. 43. And these results you accomplished by a downward draught, did you not?

A. Not so much as I did by putting wet bread and pans of water in, which absorbed the heat; and the heat was supplied gently and continuously to supply whatever heat was taken away, keeping the baking chamber at whatever temperature I wanted.

X Q. 44. Then wet bread and pans of water were necessary to start and sustain combustion, were they?

Ans. Not to start combustion; after the fires were thoroughly kindled,
then the wet bread and water, or any other material that was damp
64 enough to absorb the heat and create a partial vacuum; that convinced me that all I wanted was a larger baking chamber and a furnace constructed so the heat from the furnace would be distributed equally all over the bottom, with a system of damper top and bottom to regulate it with the chimney draught.

X Q. 45. At what time of the year was this oven completed?

Ans. In the fall of 1857.

X Q. 46. How long did it remain?

A. It remains there to this day.

X Q. 47. In the same condition? If not, what changes have been made?

A. The oven proper or baking chamber remains there yet in the rear of my house, 180 Livingston street, Brooklyn. The furnace doors and iron work was taken out, and the openings bricked up.

X Q. 48. Without regard to the reel, did you consider the oven substantially the same in principle as that which was afterwards patented to you May 1st, 1860?

A. I did, in a small scale.

X Q. 49. Are you familiar with the ovens used by the defendants in St. Louis?

Ans. Not with my own knowledge; I never saw them except through information derived from James Hall and others.

X Q. 50. You may state generally how you understand them to be heated, and how the furnace is located with reference to the bread carrier?

(Objected to.)

A. The furnace is placed in the same position, with a furnace
65 door and dead plate from castings made from patents designed

and prepared by me. The furnace is the same as mine, the arch is left off with my top damper and lower damper, as patented by me, for regulating the direct draught of the products through the chamber up or down.

X Q. 51. You have spoken of the Ball plan of heating, and you will please look at Respondents' Exhibit Ball's Original Patent, and state whether you understand the oven and mode of heating there shown and described?

A. I do, I think, thoroughly.

X Q. 52. State whether you consider defendants' said oven to be substantially the same in principle of construction and mode of operation as that shown and described in said Exhibit Ball's Original Patent or substantially different.

(Objected to.)

A. Substantially different.

X Q. 53. Instead of twice rebuilding the arch in the Anderson oven, why did you not advise him to leave the arch entirely out?

A. A perforated arch the fire-brick get to a white-heat, and when they are kept at that heat the volumes of heat that are thrown off by these fire bricks when at white-heat, with the products passing through these apertures, I firmly believe that it is a saving of half the fuel. Also by these apertures the heat is equalized all over the bottom of the oven. It makes no matter which part of the pan the crackers are on, they get all the same bake.

X Q. 54. Do you think you have answered my question?

66 (Objected to as incompetent.)

A. I think so, as I understand it.

X Q. 55. You seem to be of the opinion that fire-brick will radiate more heat than the fire from which they are heated. Is this your opinion?

(Question objected to as incompetent.)

A. No; that is not exactly my opinion; but with the perforated floor or arch I have a stronger fire on the top of the arch or a stronger heat while baking as long as the oven door is open. As the air rushes in the oven doors and passes over these apertures, it ignites the gasses or inflamable products that enter those openings, and creates a second combustion or increased heat.

X Q. 56. You have stated that you delayed your application for the patent of May 1st, 1860, because you thought Ball was the original inventor of the reel in an oven, and that many bakers thought the same for some time after you obtained your patent, but that you became better informed; and you will now state what the information which induced the change in your belief in this respect was.

Ans. I was advised to get the opinion of Charles Mason, ex-Commissioner of Patents. At that time he had an office in the Scientific American Office. He gave me an opinion. The substance of that opinion was that they were two distinct inventions and did not conflict with one another, and that I could use the reel, as Ball had no more right to it than I had.

X Q. 57. Did you subsequently obtain copies of patents showing the reel?

A. I did.

67 X Q. 58. Look at the Defendants' Exhibits Coolet Oven and Carat Patent, and state whether these are copies of the same, and, if so, how you understand the reel shown and described compares with the reel shown and described in the Ball patent.

(Complainant here objects to the foregoing question and the line of examination being pursued as incompetent upon cross-examination, and notifies counsel for defendant that if the witness is to be examined by him as an expert upon questions to which his attention was not called upon direct examination, he shall insist upon his being regarded as defendants' witness as far as relates to such examination.)

A. I consider them both rotating reels, working upon the same principle as the Ball patent.

X Q. 59. In your application for your original patent, you did not make any claim to the reel by itself or in combination with any other element, did you?

A. I have always been of the opinion that I did—the combination.

X Q. 60. Are there any of Ball's ovens now in use?

(Objected to as before.)

A. That I can't say.

X Q. 61. Do you know of any oven now in use heated substantially upon the principle described by Ball?

(Same objection.)

A. Not to my knowledge.

X Q. 62. Have you seen the ovens now used by the complainant?

A. Yes, sir.

68 X Q. 63. Will you please give the name of the man who had the French oven in New York, and the street and number where it was?

A. The number I can't give you, but it was Washington street. The name of the man I can't give, but the same oven, or model of it in wood, full size, was constructed in the fair of the American Institute, held in the Crystal Palace. I saw it myself there, in the early part of September, 1858, and I heard there that it was called the Rollians oven, and was patented in the United States. It was destroyed by the fire. This French oven was on Washington street, north of Canal two or three streets, on the west side of the street. About the same time they constructed a large bakery under the Fifth Avenue Hotel, with two or three of these ovens.

X Q. 64. Did Daniel Paton make the Exhibit McKenzie Drawing from the oven itself.

A. No; from rude drawings that I gave him and explanations.

X Q. 65. How many reel ovens are there now in use in Cincinnati?

A. I don't know exactly; six or seven, I believe. I am not prepared to say.

X Q. 66. Are you acquainted with the general construction of these six or seven?

A. I am not, except what I built myself. I haven't seen them for some time.

X Q. 67. Is there an oven now in use in Cincinnati, that you know of, having an arch over the furnace?

A. I don't know. I have not examined an oven in Cincinnati for several years. I don't know whether there is or not.

69 Q. Please state whether in your sworn statement, filed in the Patent Office, in support of your application for the extension of your reissue, the following appears: "The arch of the furnace in Anderson's oven kept tumbling down, and I had to rebuild it several times between the years 1858 & 1860, and each time I rebuilt it they allowed me, after urgent solicitation, to add some feature of my improvements, and these additions so visibly improved the working of

their oven that finally, the last time the arch broke down (in the year 1860), they gave me permission to make any alterations I saw fit, and to fix the oven as I thought best. I accordingly pulled their oven to pieces and rebuilt it throughout according to my invention, as illustrated and described in my patent now sought to be extended, and it proved a complete success. The baking capacity of the oven was more than double, the baking being done evenly and well, and the oven has been running ever since, giving entire success, satisfaction, and can now be seen in constant use at 219 Fulton street, New York City, of the same construction as when I built it in 1860."

Ans. It does, but it was a mistake and the mistake, was corrected through both of the Andersons, but not in time for to have it corrected in that; it was after the books were published that the mistakes were seen.

X Q. 68. Was the Mr. P. B. Anderson whom you have mentioned a witness on your behalf in the matter of the application for said extension?

A. Yes, sir.

70 X Q. 69. Were you present in the office of your counsel, M. M. Livingston, esquire, in New York, on March 4th, 1874, when P. B. Anderson testified in the matter of said extension on your behalf in substance that, in the year 1857, he had had an oven built by Mr. Ball under his patent of September 3rd, 1856, and then said as follows: "This oven gave me considerable trouble; this oven was built in 1857, and soon after it was built I learned that Mr. McKenzie had invented an improvement in ovens, but I did not adopt them until one time when this oven broke down, I think, about the year 1859. I am quite sure it was in the summer of 1859. I yielded to Mr. McKenzie's solicitations and told him he could reconstruct the arch of the furnace according to his plan of heating the same by direct heat, and he did so. The oven worked very much better after this alteration, change in its construction, and then, in 1860, I allowed Mr. McKenzie to make such other changes in its construction as he thought would be advisable"?

(Objected to as incompetent.) I don't think I was that day. (Counsel for defendant' remarks that this record certifies that you were. Witness replies that "I was running in and out after witnesses; these bakers could not come all at once, and I was continually running after them.")

X Q. 70. Is the above a correct quotation from the testimony of Mr. Anderson, which you filed and used in the matter of the application for and extension?

(Objected to as irrelevant and incompetent.)

X Q. 71. That is a correct quotation. Where is Mr. P. B. Anderson now?

Ans. He is dead.

71 DUNCAN McKENZIE.

The exhibit referred to in the above deposition, Hall Letter, is as follows, to wit:

Complainant's Exhibit Hall Letter.

FRIEND DUNCAN: Well, I se'pose you have been expecting a letter from me for some time, so that you might know what success I had made in respect to Cloon's oven. I finished it last Saturday two weeks ago; it is a perfect success. Meshell & Cloon are highly pleased with the way t works; it is enough to please anybody; it will bake (12) twelve bar-

rels of flour on ten bushels of coak, at a cost of eight cts. per bushel; they are now in perfect running order. I expect you have been expecting to he're from me in respect to Varing and other parties. Varing has changed his mind about the oven. He has remod'led his old oven to the Chicago coak ovens, and thinks he will try them for a while. Last week he had a fire in the rear part of his bakery, burnt the roof of, but his ovens are in good condition. He was insured. The other parties that were tawlking about putting up an oven have concluded to wait for a while. I am confident that the bakers are seeing the advantages of the reel oven more every day, and I expect that by fall I will be pretty busy, though things look rather dull at present. I took the liberty of inserting an advertisement in the Commercial setting forth myself as agent, all of which I hope you will ap'rove. Inclosed you will see the notice. I thought it ne'ssary, expres'ley, to let those in the city know that you had authorized me to act as such. I se'pose you
72 have not received aney money from Phil. Cloon; if you have you are luckey, as he is oweing me for over half my work; in fact, he is oweing most everybody that had aney thing to do with his bakery. He is about to sell the Avondale homes'e'd in the course of a couple of weeks, and then he is going back to Chicago.

Dear Fr'ende, we have all been expecting you soon. Mrs. Hall wrote a letter to Mrs. McKenzie a week or so ago; did you get it?

Please write soon and let me know when you start. No more at present, but remains yours, truly,

JEMES HALL.

P. S.—Direct your letter to box 2727, Aerated Bread.

CHRISTIAN BRIGHT, of lawful age, being produced and cautioned and sworn and examined on the part of the complainant, deposes and saith:

Question 1. State your name, residence, and occupation.

Ans. Christian Bright. I reside at 1637 Morgan street, St. Louis, Mo. My occupation is that of a baker.

Q. 2. How long have you been engaged in the occupation of baker?

Ans. Twenty-five years.

Q. 3. In what bakery are you now employed?

Ans. Garneau & Company, as foreman.

Q. 4. How long have you been employed there?

Ans. Sixteen years the first of next month.

Q. 5. What kind of ovens are used there?

Ans. McKenzie's patent-reel oven.

73 Q. 6. How long have you used that oven?

Ans. Since the fall of '64; I think it was some time in October that we started first.

Q. 7. What ovens other than that have you ever used either in the Garneau bakery or elsewhere?

Ans. None but the old-fashioned brick oven, either with furnace or inside; what they call inside oven; that is, the fire inside.

Q. 8. How have you found in your experience that the McKenzie oven of which you speak compares with other ovens with which you have been acquainted in respect to the quantity which it bakes in a given length of time?

Ans. I find them far superior to *to* any oven I have worked or seen work.

Q. 9. How have you found this oven to compare with others in respect to the quality of the work done?

Ans. The work in the McKenzie oven is more uniform bake than any oven I have ever worked at or seen work.

Q. 10. Have you observed any advantage or disadvantage resulting from the introduction into the baking oven of the heated gasses from the fire instead of heat exclusively radiated from the brick or iron work of the oven? If so, state what such advantage or disadvantage is.

(Objected to by defendants' counsel.)

Ans. I do find a good deal of advantage from a direct heat; the reason is this, in my experience, that you can't keep an oven in good heat unless you have the direct heat from the fire, and the heat uniform from the bottom of the oven. Any bread or crackers or cakes require
74 the most heat from the bottom, no matter how hot an oven is; bread, crackers or cakes will not be as light without the bottom heat, and will not look or taste as well, without they get their principal heat from the bottom.

Q. 11. What difference, if any, does it make in quantity baked in a given time whether the heat is applied at the bottom or at the sides and top?

Ans. To my knowledge it will make from forty to fifty per cent. difference in the day's work.

Q. 12. Do you mean that when the heat is applied at the sides and top there will be a greater or less quantity baked than when applied at the bottom?

Ans. That is what I mean by forty or fifty per cent. less.

Q. 13. Have you found from your experience that it makes any difference whether the heated gasses come directly into the baking oven from the fire, or the heat only reaches the oven by radiation through the walls of the oven; if so, what is the difference?

(Objected to, because it does not appear that the witness has had the necessary experience to enable him to answer.)

Ans. As to my experience and my judgment as a baker I have never seen an oven that can be kept agoing all day—at work all day, that's what I mean—and turn out as much work without the direct heat; there will either get too cold or not bake the bread or crackers uniform.

Q. 14. Does it make any difference in the quality of the bread or crackers turned out whether the heated gasses pass through an
75 open space from the flame to the material to be baked, or the heat only reaches such material by radiation from the walls of the oven?

(Last objection repeated.)

Ans. From my experience about that is this: I find the goods bake lighter, and more equal, and a better flavor than anything else—than baked in anything else, than baked in any other oven. It does make a difference; they bake quicker and lighter.

Q. 15. Have you ever used ovens in which the heat only reaches the material to be baked by radiation from the walls of the oven?

Ans. I have not, but I have seen them at work. I never seen the goods baked well or uniform.

Q. 16. How does the heat enter the ovens which you have been using at the Garneau bakery, and to which you refer as the McKenzie oven?

Ans. The heat enters through what we call pigeon-holes from the side and top of the fire-arch.

Q. 17. How is the oven located with reference to the fire-arch?

Ans. The fire-arch is on the bottom, the oven is over it.

Q. 18. How large a quantity of hard bread or crackers can be baked in one of these McKenzie ovens in a day?

Ans. There can be a hundred barrels of flour baked into bread in a day; I have baked a hundred and ten already in eleven hours.

Q. 19. How many barrels of hard bread will a hundred barrels of flour make?

Ans. From two hundred and fifty to two hundred and seventy-five; some flour will turn out more and other less.

76 Q. 20. How large a quantity did you ever bake in the same length of time in any other oven that you have used?

Ans. I never baked more than seven barrels of flour in any other oven that I have used.

(Defendants' counsel objects to foregoing as incompetent.)

Cross-examination by EDWARD BOYD, Esq.:

X Q. 1. Have you ever used a Ball reel oven?

Ans. I believe that is what they call ours, the Ball reel oven, except the McKenzie improvement, I think.

X Q. 2. What is the McKenzie improvement?

Ans. As far as I know or understand, the furnace and fire-arches.

X Q. 3. By the furnace and fire-arches you mean the manner of conducting the heat to the oven, do you not?

Ans. I do, sir.

X Q. 4. What other reel ovens besides that of Garneau & Co.'s have you ever used?

Ans. None.

X Q. 5. Have you ever used any other with a mechanical bread-mover?

Ans. I have not. I have seen them at work, though.

X Q. 6. What kind and where?

Ans. I have seen one in Philadelphia. I could not tell the name of the patent. It was called the mechanical oven. I could not tell whose patent it was.

X Q. 7. What kind of an oven had you in your mind when comparing the quantity and quality of work done by the McKenzie oven with others?

Ans. They were—I could not tell the name of the patents;
77 there was the chain oven, pivot bottom oven (I do not know the patent), and Hall oven—Hoffmaster's circle oven I believe they call it, Hoffmaster's patent; and vale oven, and the old style oven what they call Dutch oven—what they call the inside oven.

X Q. 8. When you speak of the advantages of bottom heat, you mean heat passing direct from the furnace to the oven, do you not, contradistinguished from radiated heat?

Ans. I do.

X Q. 8. What oven do you refer to in which the heat only reached the material to be baked by radiation from the walls of the oven?

Ans. The chain oven, circular oven, Hoffmaster's patent, and the mechanical oven.

X Q. 10. What difference is there, either in quality or baking properties, between what you term direct and radiated heat?

Ans. The quality is lighter and sweeter; you bake more by the direct heat than by any other heat, as long as it is uniform through the oven.

X Q. 11. You evidently misunderstand my question, which relates to the quality of the heat and not to the material to be baked; with this explanation please answer.

(Objected to by counsel for complainant as incompetent, the witness not having testified upon direct examination as to any special scientific

knowledge of the properties of heat or heated gasses, but simply as to the results which he as a practical workman had observed.)

Ans. The heat is fresh from the furnace, and not second-handed, as through a flue or heated brick or something else.

78 (Objected to by defendants' counsel as not responsive to the question.)

X Q. 12. Read the question?

Ans. The heat is more strong and has more power from the fire.

X Q. 13. Suppose an oven to be constructed so that an even and any desired degree of temperature could be obtained and continued wholly by radiation, would you not consider such an oven equally good for all practical purposes as one that was heated by direct rays from the furnace?

Ans. I would not.

X Q. 14. Why?

Ans. Because the heat would not have the same power as the direct heat or the fresh heat from the fire, unless it is on brick. I do not believe an oven could be erected of that kind, unless it would take more than one-half the fuel more.

X Q. 15. Not regarding the quantity of the fuel and assuming that the temperature in the oven when heated by radiation to be the same as when heated by direct rays from the furnace, what would be the difference, if any, in the baking quality of the oven?

(Last objection by complainant repeated.)

Ans. The bread or crackers would not rise as high or get as light as with the direct heat.

X Q. 16. How do you know this?

Ans. I know it by experience.

X Q. 17. How do you know it by experience when you say in your direct examination that you never used an oven heated only by radiation?

79 Ans. I mean by using a furnace-oven where the fire is blowed into the oven through a furnace and is shut off so that you have no direct heat from the fire, the heat has to accumulate there first before you bake anything.

X Q. 18. Was this the kind of a radiating oven you understood to be embraced in my questions X Q. 13 and X Q. 15?

Ans. I did.

X Q. 19. You are mistaken. My questions, as stated, related to an oven continuously kept at any degree of heat desired by radiation, and you may assume that it is surrounded on three sides either by a furnace or flues connecting with a furnace, and with this explanation what difference would there be in the baking properties between such an oven and one receiving the heated gasses direct from the furnace?

Ans. The heat would not be as uniform.

X Q. 20. My question assumed that the heat was uniform?

Ans. I do not think the heat would be as powerful from there as from the furnace, and it could not be kept at such a regular temperature all of the time.

X Q. 21. But if it could be made as powerful and kept as regular there would be no difference, would there?

Ans. That's a different question. I do not believe it could be made as powerful, it would lose some strength through the flues or somewhere.

X Q. 22. When you say in your direct examination that you have found the McKenzie oven far superior to any other that you have

80 worked or seen worked, did you intend to include the Hall oven?
Ans. I did.

X Q. 23. Do you know how the defendant's product of the oven used by them compares in the market as to prices with that you produce with your McKenzie oven?

Ans. I do not; only by heresay.

X Q. 24. From whom have you heard it?

Ans. By men that worked with them.

X Q. 25. How do they compare?

(Objected to as incompetent.)

Ans. I misunderstood your question. I misunderstood that altogether. I understood that it was the quality that the oven would bake. I do not know anything about their prices or how they do sell.

CHRISTIAN BRIGHT.

FRANK MILLWOOD, of lawful age, being produced, cautioned, sworn, and examined on the part of the complainant, deposes and saith:

Question 1. State name, age, residence, and occupation.

Ans. Frank Millwood; forty-one years of age. I reside in Ludlow, Ky., and am engaged professionally in Cincinnati, Ohio, as a solicitor of patents and mechanical engineer.

Question 2. State what opportunities you have had of becoming acquainted with different mechanical devices and the principles involved in their construction and operation, and what experience, if any, in comparing such devices for the purpose of determining their similarity or difference in construction and mode of operation?

81 Ans. For over twenty-six years I have been engaged wholly in mechanical operations; successively, a practical machinist, practical draughtsman, and master mechanic in manufactories, and in the preparations of letters patent for various mechanical devices, during which time my study and practical experience I have become familiarized with the principles of mechanism and the proper application thereof to the construction of machines. I am almost daily called upon to examine and compare mechanical divices as to their essential similarity or dissimilarity, and to frequently testify in the circuit courts of the United States in the trial of patent cases.

Question 3. (Counsel for complainant here offers in evidence certified copy of reissued letters patent No. 4026, granted Hosea Ball June 14th, 1870, for improvement in bakers' ovens, as a reissue of letters patent dated September 23rd, 1856; also a certified copy of reissue No. 6379, granted Duncan McKenzie April 20, 1875, for improvement in bakers' ovens, as a reissue of letters patent originally granted May 1st, 1860, and marks the same, respectively, Complainant's Exhibit Ball Reissue, and Complainant's Exhibit McKenzie Reissue.) (3.) Will you now look at Complainant's Exhibit Ball Reissue and Complainant's Exhibit McKenzie Reissue, and state whether you understand the alleged improvements described and claimed in the said reissues severally?

Ans. I have carefully read and examined the two exhibits re-
82 ferred to in the question, and believe I understand the construction and operation of the improvements shown and described therein.

Ques. 4. State whether you are acquainted with the firm of Dozier, Weyl and Co., of St. Louis; and, if so, whether you have ever been in their bakery in said city of St. Louis and examined the ovens there used by them.

Ans. I am acquainted with said firm, and have examined the ovens used in the bakery of said firm. The location of said bakery is at the corner of Sixth and Pine streets in, this city.

Ques. 5. Will you now describe the oven or ovens which you there examined; also state when you saw them?

Ans. I examined these ovens yesterday; the drawing I now mark F. M., No. 1, represents substantially correct the largest of two reel ovens used in the bakery, and the only difference between this oven and the smaller one is the size and the number of pans on the reel; the one shown in the drawing being a twelve pan reel and the other having but eight pans. The construction of these two ovens is substantially as follows: A large reel is fitted to revolve within an arch-top oven or baking chamber, a number of bread trays being suspended at each end of the reel, as shown in the drawing. At the bottom of the oven two furnaces or fire flues are arranged, the operation of which submits the bread trays to the application of heat which is not only direct in the sense of being applied in the actual contact of the gas eous pro-
83 ducts of the furnace to the pans, but is also direct in the line of communication by which it is enabled to reach the pans, the furnaces having no enclosed cover and no provision for side delivery of the gases to the bread chamber; the bread chamber in each of these reel ovens is supplied with two flues, one communicating with the top of the chamber and the other with two aperatures in the bottom thereof, as shown in the drawing, both flues being governed by dampers to permit the escape of smoke, &c., during the operation of lighting up, and the regulation of the temperature during the operation of baking.

(Complainant here offers in evidence the sketch referred to by the witness, and makes the same Complainant's Exhibit F. M., No. 1.)

Ques. 6. Will you now compare the ovens described by you in your last answer with the alleged improvements described respectively in Complainant's Exhibit Ball Reissue, and claimed in the first claim thereof, and the alleged improvements described in Complainant's Exhibit McKenzie Reissue and claimed in the first claim thereof, and state whether in your opinion said ovens contain the improvements embraced in either or both of said claims, giving in full your reasons for any opinions you may express?

Ans. I am clearly of the opinion that each of the ovens to which I have referred as being in the bakery of Dozier, Weyl & Co., and of which Exhibit F. M., No. 1, is a substantially correct representation, does contain the particular improvement specified and shown in the Ball reissue, and set forth in the first claim thereof, and each
84 also contains, in my opinion, the particular improvement in bake ovens shown and described in the McKenzie reissue, and summed up in the first claim thereof, for the following reasons and under the following understanding of the patents referred to: In the Ball reissue a bake oven is shown and described in which a reel carrying at the ends bread trays suspended from the end plates thereof, the reel revolving within a bread chamber arranged over the top of the furnace, the top of the furnace being impervious to the products of combustion, the gasses passing out of the furnace sideways into side passages around the bread chamber, the walls of the bread chamber having side aperatures to permit the currents of heated gasses to pass sideways into the bread chamber for the purpose of enabling said gaseous products to come into direct contact with the bread in the oven; in other words, the products of combustion are enabled to pass into or through the bread chamber within which the bread holders move, in con-

tradistinction to bake ovens in which the bread is baked by the radiation of heat from the walls of the bread chamber which is heated exteriorly by the furnace; I understand, therefore, that in the operation of this Ball oven that while the communication between the furnace and the bread chamber is shown in the patent as indirect, the application of the heat of the gaseous products to the pans is direct, with all the accompanying advantages of circulation, actual contact with the bread, &c.; and I understand, furthermore, that the improvements
85 specified in the first claim of the Ball reissue would include all ovens in which the pans of the reel described therein had such communication with the furnace that the pans were subjected to direct contact with the products of combustion, whether they reached the bread chamber by a circuitous route or a direct one, although the patent does not describe any but the circuitous one, and does not suggest any way of accomplishing the direct communication, the essense of the operation being that "the products of combustion will pass into or through the chamber;" with this explanation of my understanding of the Ball reissue as to the improvements specified in the first claim, I repeat my opinion that the ovens shown in F. M., No. 1, contain the improvement specified in the following words in the Ball Reissue Claim 1: "One or more swinging bread-holders suspended from the arms or end-plates of a rotating reel, in combination with a furnace so arranged and connected that the products of combustion will pass into or through the chamber within which the bread-holders move." With reference to the bake oven shown in the McKenzie Reissue, it may be described as having the same kind of a reel and bread-trays revolving within a bread chamber made differently from that shown in the Ball Reissue, and operating in conjunction with a furnace communicating differently with the bread-chamber that is shown in the Ball Reissue. The bread-chamber, as shown in the McKenzie Reissue, is not formed with double walls like the Ball oven for the gasses to remove the inner wall,
86 but is simply a solid shell having no application of heat at the sides, but receiving its heat and gasseous currents directly from the fire. And the furnace is not like the Ball, adapted to deliver the gaseous products to side-chambers, and from there into the bread-chamber, but the furnace in the McKenzie delivers all its gaseous products directly into the bread-chamber. So that while the McKenzie embraces obviously the direct application of heat to the bread which is specified in the first claim of the Ball reissue, the McKenzie reissue specifies an important improvement in respect to the means of communication between the furnace and bread-chamber for the passage of the gaseous products from the furnace to the bread-chamber; these products, as I before stated, passing upwards directly from the furnace to the bread-chamber. The oven shown in the drawing F. M., No. 1, is one having a reel answering fully to the description of the reel shown in the McKenzie patent, and it has also a single casing bread-chamber like the McKenzie, and furnace having a direct communication with the bread-chamber and trays like the McKenzie, the only difference being that the heat and gaseous products pass upwards in the McKenzie through aperatures in top or corner of the furnace, while in defendants' oven the crown is entirely removed, so as to enable them to pass upwards more freely. With this explanation I am of the opinion, as before stated, that the ovens shown by Exhibit F. M., No. 1, embraced the improvement specified in the following language of the McKenzie reissue, claim 1: The combination of the following elements, to wit, a
87 furnace or fire-place (one or more), a baking chamber arranged

above such furnace or fire-place, and in direct communication therewith, only a rotating reel located within said baking chamber, and provided with gravitating pans or shells arranged or hung around the shaft of said reel from rods attached to the end plates or arms thereof, substantially and as and for the purpose described.

Ques. 7. Were the reel ovens which you saw in the bakery of Dozier, Weyl & Co. in operation when you saw them?

Ans. They were.

Ques. 8. Will you state whether there is any difference in effect between the application of heat radiated through the walls of the baking chamber and the application of the gases direct from combustion to the material to be baked, also whether there is any advantage or disadvantage in the application of these heated gases beneath the material to be baked, as compared to the application of the same above or at the sides?

(Objected to because it does not appear that the witness is competent to answer.)

Ans. I have never seen an oven in operation in which the gaseous products were conducted through the sides of the bread-chamber, but I am of the opinion, as I think is obvious, that the heated currents when rising upwards, as in the McKenzie, impinge upon the bottom of the pans directly so as to enable the bread to rapidly take up the heat and the bread to be baked with uniformity; while as in the Ball oven, where the currents are delivered through the side openings, the greater
88 amount of heat will be taken up before it reach the bread and the heat would not be so effectively distributed around the pan. One of the important differences, moreover, is the saving of fuel where the communication is direct, as in the McKenzie or defendant's ovens.

Ques. 9. Is your answer intended to apply to the difference in effect between the application of the products of combustion directly to the material to be baked, and the application only of heat by radiation from the walls, or does it apply to the difference between the effect of applying the products of combustion to the bottom and to the sides and top of the baking-chamber?

Ans. It applies only to ovens both of which heat the bread by contact of the gaseous products with the bread pans, one having the current conducted through apertures at the sides of the bread-chamber, and the other having the current rise directly from the fire. It does not apply to ovens in which the fire has no communication with the interior of the bread-chamber, the construction and operation of the latter being entirely different from the construction and operation of the two forms referred to in my last answer, to wit, the Ball and the McKenzie.

Ques. 10. What difference in effect, if any, is there between the application of heat by radiation exclusively and the application of the products of combustion directly to the material to be baked?

Ans. One important difference is that when the application of heat is by radiation only, there is no provision for the circulation
89 of the air and gaseous emissions from the bread or the carr'ing off of the moist vapors. One other difference is that when the application of heat is by radiation only, the baking of the bread is much less rapid, much less perfect, and the consumption of fuel much greater.

(Complainant here offers in evidence a certified copy of an assignment from Duncan McKenzie to Joseph F. Garneau, and marks the same "Complainant's Exhibit, McKenzie Assignment.")

Cross-examination by Mr. BOYD:

X Q. 1. Are you not aware that in reel ovens, heated exclusively by

radiation, and used before the date of either of complainant's patents, provision was made for the circulation of air and the gaseous emissions from the bread and for carrying off the moist vapors?

Ans. I don't know about the prior use, but I have some indistinct recollection of a French patent in which the oven has small outlets at or about the journals of the reel, and I think the patent states that the gases emitted from the bread can be carried off thereby.

X Q. 2. In such a construction, do you think the baking of the bread would be less rapid or less perfect than in an oven heated by the introduction of the products of combustion directly from the furnace, the temperature of both ovens being assumed to be equal?

Ans. It would be much less rapid with the same application of heat, or, in other words, with the same consumption of fuel, for the reason that where the fire was on the outside, and circulation to carry off the gasses was attempted, there would, necessarily, have to be an
90 inflow of cold air to keep up or induce the circulation. In the ovens in which the fire is in the inside, no such cold-air currents exist, as the inflowing current passes through the furnace before it reaches the bread-chamber. I don't see, furthermore, how an oven with the escape apertures at the center of the reel could permit the proper escape of gases from the bread.

X Q. 3. My question has no relation to the quantity of fuel consumed, and without reference to the economy of fuel. What is your opinion?

Ans. Assuming then that the ovens referred to heated exteriorly only is provided with proper means for the escape of the gases from the bread, and the temperature inside was uniformely of the same temperature as the one in which the fire was located inside, there could not be, so far as I am now aware, any difference in the rapidity of the baking or the perfection of the same. There may be some chemical difference between submitting the bread to the heated gases emitted from a furnace and subjecting it to rays of heat from brick walls only the oven not receiving any direct rays from the fire, but if there is, I have not investigated sufficiently to know the reason thereof.

X Q. 4. Are you familiar with a process of baking in which the material to be baked is enclosed in substantially air-tight vessels or boxes, so that no gases can be emitted from the dough which thus enclosed is baked by radiated heat?

Ans. No.

91 X Q. 5. Which produces the better bread, a slow or a rapid process of baking?

Ans. The rapid process, so long as it is not so rapid as to crust the outside before the interior is properly baked.

X Q. 6. What features distinguish the elements of the first claim of the "McKenzie reissue" from the elements of the first claim of the "Ball reissue"?

Ans. There are the same numbers of elements in each, to wit, a furnace, a baking chamber, and a rotating reel provided with gravitating pans or sheils suspended from the arms or end plates, the difference being in the construction and arrangement of the baking chamber and furnace with relation to the reel, and this difference is indicated in the two claims by the following language in the one: "Arranged and connected so that the products of combustion will pass into or through the chamber within which the bread-holders move;" and the following language in the other: "A baking chamber arranged above such furnace or fire flues and in direct communication therewith." Both ovens, of

course, fall within the scope of the first quotation, but one only of these two (the McKenzie) falls within the scope of the last quotation.

X Q. 7. Please describe more particularly the differences in the mechanical construction which distinguish the elements of these two claims.

Ans. In the Ball oven mentioned in one of these claims the baking chamber has double walls and the furnace has a completely enclosed top, the products of combustion being caused to pass into the bread chamber through side-openings in the inner wall of the baking
92 chamber. In the McKenzie the baking chamber is a single wall, and the crown of the furnace has openings to give a direct communication from the furnace to the bread chamber. This is the difference mechanically. The Ball reissue suggests that the course of the products of combustion may be indirect or direct, but shows the indirect course only, and does not suggest any construction of baking chamber and furnace in which the heat can be applied directly. It is probably obvious from this language of the patent, "direct or indirect," that ovens made with a baking chamber or furnace might be arranged with a direct means of communication and still fall within the scope of the Ball invention, and also still be of themselves new, useful, and patentable differences.

X Q. 8. Are not the flues essential to the practical operation of the furnace and oven combined in the first claim of the McKenzie reissue?

Ans. It is essential that there should be some form of opening or openings over the furnaces, but it is not essential, in my opinion, in this first claim that there should be a system of flues, as that system is provided for in the second claim particularly.

X Q. 9. You understand, do you not, that in the McKenzie arrangement specified in the first claim of the reissue there are two chambers, a fire and a baking?

Ans. Yes.

X Q. 10. Do you find in the defendant's oven such two chambers?

Ans. Yes; there is the chamber or furnace for the fuel to be
93 placed in and the baking chamber for the reel to revolve in.

X Q. 11. The furnace forms part of the bottom of the reel chamber in defendant's oven and is destitute of any system of connecting flues, s it not?

Ans. I think it may be fair to say so to the first part of the question, and to the last more certainly. The drawing, however, F. M. No. 1, speaks for itself in these particulars. The openings in the top of the furnaces of the defendant's ovens may be regarded as wide flues, but although they are in every essential respect the directly communicating openings referred to in the first claim of the McKenzie reissue, they are not, in my opinion, the peculiar continuous system of flues set forth particularly in the second claim of said reissue.

X Q. 12. Is there any other system of communication between the furnace and reel chamber shown in the McKenzie reissue other than that specified in the second claim thereof?

Ans. No.

X Q. 13. Is the flue I essential to the operation of the McKenzie oven?

Ans. It is not essential that it shall be of that construction, but it is desirable, if not essential, that there should be some flue from a point at or near the bottom of the baking chamber to lead into the chimney I.

X Q. 14. Where an open furnace like that of the defendant's is used it is necessary, is it not, that the reel should be revolved during the process of baking?

Ans. It is certainly very desirable, if not essential.

94 X Q. 15. Are you not clearly of the opinion that it is essential?

Ans. It is possible that baking can be done with some degree of efficiency without revolution during the process of baking, but the revolution is necessary, after the baking to empty the pans, and for uniformity of baking it is essential that it should be revolved also during the process of baking.

X Q. 16. If it were desired to have the reel at rest during the process of baking it would be necessary, would it not, to have the temperature in all parts of the oven uniform, or nearly so, in order efficiently to do the work?

Ans. Yes, where uniformity of baking were desired.

X Q. 17. Such a uniformity of temperature could not be secured in the defendant's oven, could it?

Ans. I think not.

X Q. 18. Suppose a reel to be sustained in a shell or casing unequally heated from without, whereby bread is baked by the unequal radiation of heat from the inner surface of the shell, and state what, if any, difference there would be in the office of such a reel and that shown in either of complainant's patents?

Ans. If the reel was in all respects like the one shown in complainant's patents, that is, of the construction shown therein, and adapted to revolve for the successive delivery of the bread from the shells, and for the carrying of the bread upon each shell successively through the hot portions of the oven, there would be no difference so far as the office of the reel is concerned.

95 X Q. 19. Suppose an open furnace at or on the bottom of the baking chamber which is provided with a travelling bread carrier to pass the bread immediately over the fire, and state what, if any, difference there would be between the action of the heat upon the material to be baked in such an arrangement and where a reel is substituted for the travelling bread carrier.

Ans. I don't know what construction is intended to be assumed by the phrase travelling bread carrier, but I can imagine travelling bread carriers in which the operation in connection with the fire would be entirely different from a reel, as, for example, it might be a carrier which would submit the bread to the action of the fire only at intervals, or it might be one in which delivery of the bread could not be accomplished without putting out the fire, or it might be one in which a line of trays *are* over the other would be submitted to the direct rays from the fire and the bottom one only be acted upon by the fire at any one time; so far only as the action of the fire upon a given pan is concerned, so long as that pan is exposed to the direct action of the fire, it makes no difference what that pan is carried by.

X Q. 20. Did you testify in the cases of Hosea Ball vs. John Bailie, and Hosea Ball vs. G. K. Withington and O. M. Langdon, in the circuit court of the United States for the southern district of Ohio, in which was the question of the infringement of Complainant's Exhibit Ball Reissue, in behalf of said Ball?

Ans. Yes.

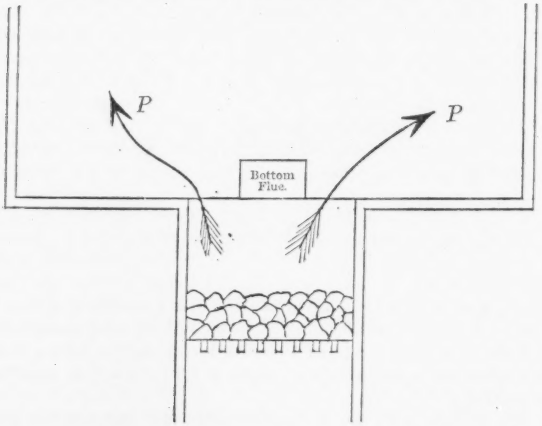
X Q. 21. Were the defendant's ovens in those cases substan-

96 tially like that of the defendant's in this case?

Ans. Yes.

X Q. 22. In your examination in said case against Bailie you made a sketch of which the annexed is a letter-press copy, did you not?

FIG. 3—Reel chamber for revolving trays.



Ans. Yes, I made that sketch and two others upon the same sheet to illustrate my understanding of the words "directly or indirectly" as used in the Ball reissue, in reference to the line of communication between the furnace and bake oven, and to show what would, in my opinion, fall within the scope of those words. The first sketch I made was an illustration of the "indirect;" the second was a conception of my oven to illustrate what could be called direct, and still be in some respects like the Ball construction, and essentially like it in principle and operation; the other, the one now attached, was an illustration, the Hall, also of the direct form, but still falling within the scope of the Ball reissue.

X Q. 23. And in answer to a question inquiring of you whether or not these sketches were taken from the drawings of the Ball reissue, you answered as follows, did you not: "They are not, they are simply suitable illustrations from the language of the patent?"

97 Yes, sir; that was my answer. I believe the language referred to in that answer was the simple words, "directly and indirectly," and I made the second and third sketch to show what would be direct by illustrations of ovens which would be direct within the meaning of said language and still be new constructions and improvements.

X Q. 24. In your opinion would not a bake oven composed of a revolving reel substantially like complainant's incased in a thin metallic shell, also made to revolve immediately over an open furnace, be made economic in the consumption of fuel than an oven made like that shown in the Ball reissue?

Ans. No, I think not, as the Ball oven permits the products of combustion to pass in and through it.

FRANK MILLWARD.

The McKenzie assignment referred to in the foregoing deposition is

in the words and figures following, to wit:

McKenzie assignment.

The U. S. Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of an assignment recorded in liber D 18, page 4.

In testimony whereof I, R. H. Duell, Commissioner of Patents, have caused the seal of the Patent Office to be hereto affixed this first day of April, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundredth.

[PATENT OFFICE SEAL.] R. H. DUELL,
Commissioner.

98 D. 18, p. 4.

This agreement made and entered into by and between Duncan McKenzie, of the city of Brooklyn, in the State of New York, party of the first part, and Joseph F. Garneau, of the city and county of St. Louis and State of Missouri, party of the second part, witnesseth:

That whereas the said Duncan McKenzie, party of the first part, is the original and first and inventor discoverer of a new and useful baker's oven, and he having assigned his said improvement and invention to Mary Ann Elizabeth McKenzie, his wife, thereupon on the first day of May, A. D. 1860, letters patent for said baker's oven were duly granted and issued to said Mary Ann Elizabeth McKenzie, assignee of said Duncan McKenzie, by the United States of America, said letters patent being numbered 28130, whereby the said Mary Ann Elizabeth McKenzie became and was the patentee aforesaid as assignee of said Duncan McKenzie as aforesaid; and whereas afterwards said patent having been surrendered the same was cancelled and new letters patent ordered to issue to her on an amended specification, and thereupon new letters patent numbered 3929 reissue were on the 19th day of April, A. D. 1870, granted and issued by the United States of America to her, the said Mary Ann Elizabeth McKenzie, assignee aforesaid. And afterwards, to wit, on the 24th day of March, A. D. 1874, the said Mary Ann Elizabeth McKenzie, being then a citizen and resident of the State of New York, did by an instrument under her hand and seal, for value received, duly
99 assign, transfer, and set over unto the said Duncan McKenzie all her right, title, and interest in and to the said patents, improvements, and inventions, which instrument last mentioned is duly recorded in the office of the Commissioner of Patents, being the United States Patent Office; and whereas afterwards, on the 30th day of April, 1874, said above-mentioned patent was by the Commissioner of Patents duly renewed and extended for the term of seven (7) years from the first day of May, A. D. 1874, to the said Duncan McKenzie:

Now, therefore, know all persons by these presents that the said Duncan McKenzie, party of the first part *of* aforesaid, for and in consideration of the sum of sixteen hundred dollars to him in hand paid, the receipt whereof is hereby acknowledged, has bargained and sold, assigned, transferred, and set over unto the said Joseph F. Garneau, his heirs, executors, and assigns, all the right, title, and interest of him the said Duncan McKenzie, in the aforesaid invention, improvements, patents, and extension within and for and throughout the county of St. Louis, in

the State of Missouri aforesaid, for the full term of said patent and for the term of said extension of seven years, and for the terms of any patents of the same or other improvements thereof, or any extension for or of either thereof, which may be granted to said Duncan McKenzie, party of the first part, his heirs, executors, administrators, or assigns, to make, use, or vend the same within and throughout said county of St. Louis, giving, granting, assigning, and transferring unto the said Joseph F. Garneau the sole and exclusive right to make, use, and vend the said improvement, invention, and patent throughout, within, and for
100 said county of St. Louis, and to grant unto others the right to make, use, vend the same within, for, and throughout the county of St. Louis or any part thereof, for the terms aforesaid of said patents and extensions.

In witness whereof the said Duncan McKenzie, party of the first part, and the said Joseph F. Garneau, party of the second part, have hereunto set their respective hands and seals this second day of June, A. D. 1874, at said city of St. Louis.

DUNCAN McKENZIE. [SEAL.]
JOSEPH F. GARNEAU. [SEAL.]

STATE OF MISSOURI,
County of St. Louis :

Be it remembered that Duncan McKenzie, who is personally known to the undersigned, a notary public within in and for said county of St. Louis, duly commissioned and qualified, to be the person whose name is subscribed to the foregoing instrument of writing as a party thereto, this day appeared before me and acknowledged that he executed and delivered the same as his voluntary act and deed for the uses and purposes therein contained.

Given under my hand and notarial seal this 2nd day of June, 1874.

[SEAL.] M. KINEALY,
Notary Public, St. Louis Co., Mo.

Recorded June 13th, 1874. Ex'd C. C. W.

JOHN T. WILSON, a witness, being called on behalf of complainants, and being first duly sworn, deposes and makes answer as follows :

1. State your name, age, residence, and occupation.

A. John T. Wilson ; age, 52 years ; residence, 5 Park avenue, New York ; occupation, ship bread and cracker baker.

101 2. State what opportunity, if any, you have had of becoming familiar with the art of bread baking and the appliances used in that art.

A. I have been engaged in the business without interruption since February, 1839. I have seen all the different styles of ovens that have been used in the cracker baking business in this city. Until the year 1853, there was no mode of baking in anything but the ordinary stove ovens, tile ovens. The oven was heated either by wood or coal from a fire kindled in it or in a furnace beneath or adjacent to it and communicating therewith. The biscuits to be baked were placed upon a peel and laid on the bottom of the oven. When sufficiently baked they were taken out and the oven again heated for another batch. The next step in improvement in the art of baking was the introduction of mechanical ovens, the first of which that came under my knowledge was one built by Mr. Hosea Ball in Front street, this city, in 1853, which was used about two years, when the bakery was destroyed by fire. Mr. Ephraim Treadwell, who owned the oven at the time it was burned, then brought into use the wire belt oven, which is known as the Treadwell patent

wire oven. The next mechanical oven I saw was in the spring of 1856, which was built by Mr. H. Berdan which, after being in use about a year, was destroyed by fire. The next oven I saw was that built by Mr. Hosea Ball, in January, 1857, for Robert Anderson for his bakery in Fulton street, New York, No. 219. That was the first reel oven which was constructed in this city. In a few years after the reel oven was adopted by bakers generally and has become the favorite form of oven for
102 ship bread and cracker baking throughout the United States. For myself I had in use during the year 1862 two reel ovens. From the 1st of May, 1863, for about 2 years I had in use 5 reel ovens; 4 of them were heated by a process known as the Allen and Pick patent, which was that the fire was made in a furnace under the floor of the oven which was solid and the heat was allowed to enter the oven through a row of pigeon holes on each side wall just above the oven floor. This mode of heating the oven was quite unsatisfactory, and in 1863 I applied to Duncan McKenzie to place his patent furnaces in the four ovens and to build me a fifth oven after his own patent. After Mr. McKenzie had changed the furnaces and flues of the four ovens so they conformed to his patent arrangement the baking capacity of the oven was increased 100 per cent.; that is to say, from being able to bake only 40 barrels of flour in ten hours we were enabled by Mr. McKenzie's process of heating to bake 80 barrels of flour in 10 hours. The quality of the biscuits baked as regards thoroughness of baking and uniformity was also greatly enhanced. We were so much pleased with this result that we had a fifth oven built immediately, according to Mr. McKenzie's own plan of construction throughout, and it gave us great satisfaction, and we have continued to use it to the present time. It will bake 100 barrels of flour in 10 hours into biscuits such as are used by the U. S. Army. It occupies a space of 18 feet in depth by 12 feet in width and is about 20 feet high.

103 3. Please state how the McKenzie ovens now in use by you compare in quality and quantity of work with the ovens in use prior to 1856, and also with those in use before this Mackenzie oven was introduced.

A. The McKenzie oven effects a great economy in labor, in fuel, and in space as compared with the tile ovens which were in use prior to the mechanical ovens. In labor the saving is very great. Four men were required to fill and empty two tile ovens the maximum capacity of which was 12 barrels of flour each in ten hours. The fuel required to heat those two ovens was about ½ ton of coal. The space they occupied was 25 to 20 feet, and about 12 feet in height. Two of the McKenzie ovens each capable of baking 80 barrels of flour in 10 hours would occupy the same space necessary for the 2 tile ovens, four men would empty and fill these two McKenzie ovens in 10 hours, and the result of their labor would be 160 barrels of flour baked. The fuel required to bake these 160 barrels of flour would be 1 ton of coal, anthracite—the same as used in tile ovens. The parties who have used the original oven put up by Ball in Front street, known as the Novelty oven, and also those who have used the Treadwell wire belt oven and the Berdan oven, have long since abandoned their use and are now using the McKenzie oven, giving it the preference on the score of economy and the uniform good quality of the crackers baked in it.

104 4. So far as you are acquainted with the art, are any of those ovens in use prior to the McKenzie oven now built, or have they within the last few years been built in what are considered first-class baking establishments?

A. As far as I have any knowledge from personal observation or from information derived from other bakers, the use of any oven but the McKenzie reel oven is unknown.

5. Are you acquainted with what is known as the old French reel oven?

A. I have seen a working model.

6. Will you describe its construction?

(Counsel for respondents objects.)

A It was a reel similar to that in use in the McKenzie oven surrounded by a circular enclosure or wall, outside of which was another wall, making a hollow space or air chamber into which the heat from the furnace entered. The baking chamber which contained the reel was then heated by radiation, the product of combustion from the furnace not entering the baking chamber.

7. Was that oven in your opinion a practicable one?

(Counsel for respondents objects.)

Question withdrawn.

8. How, in your opinion, would that oven compete with the McKenzie oven?

(Counsel for respondents objects.)

A. Unfavorably to the French reel.

Q. 9. To what extent?

(Counsel for respondents objects because it does not appear that
105 the witness has any knowledge of the use or operation of the French oven which he described, and because otherwise incompetent.)

A. In the economy of working it, as to the expenditure of labor & of fuel necessary to bake the same number of barrels of flour.

10. Can you give some estimate as to the degree of advantage upon the side of the McKenzie oven, in respect to the amount baked with the same labor and fuel?

A. No; I don't think I can give an answer on that point.

11. Upon how large a scale have you been engaged in baking during the last 30 years?

A. Previous to the year 1861 we had a capacity which we often used for baking 100 barrels of flour in 24 hours. During the 4 years of the war we had a capacity for baking 800 barrels of flour in 24 hours, which we did at different times. Since the war we have retained the capacity of 300 barrels of flour in 24 hours, which we have sometimes used.

12. Under what name is your business carried on?

A. John T. Wilson & Co. I am John T. Wilson.

13. In what markets are your bread used?

A. In South America, Africa, East Indies, West Indies, and the United States.

14. How was the heat introduced into the McKenzie ovens, built for you, and the other ovens, which you have referred to as "McKenzie ovens"?

106 A. By a furnace built underneath the floor of the baking-chamber, the covering of which was perforated with pigeon-holes, through which the product of the combustion went direct into the baking chamber.

Cross-examination by Mr. BOYD:

X 15. Please look at Complainant's Exhibit, Ball Reissue, and state if the oven built by Hosea Ball for Robert Anderson was like the one there shown and described.

(Ex. shown witness.)

A. From the description given by Mr. Anderson to me of the description of the oven in those parts which I could not see by looking into the baking chamber, and from the openings marked "E E" on the diagram, I should judge it was the same.

X 16. What became of this oven?

A. Mr. Anderson informed me that he had employed Mr. McKenzie to reconstruct the flues in a manner similar to the reconstruction which he had accomplished for me in changing my ovens from the Allen and Pick patent to the McKenzie oven.

X 17. Why was this change made, if you know, and when?

(Counsel for complainant objects to the question as incompetent.)

A. With the expectation that the baking capacity of his oven would be thereby increased. When it was done he informed me that his expectations had been realized. I think it was in the year 1862.

X 18. Have you any knowledge of an oven built substantially like that shown in Complainant's Exhibit, Ball Reissue, now being or having been in use since the Anderson oven?

107 A. My impression is that Mr. Ball built one for Mr. McGay, Isaac McGay, which I saw working.

X 19. Give the address of Mr. McGay and the date when you saw the oven used.

A. His bakery was then on the corner of Houston and Forsyth streets and is now. Mr. McGay is dead. I saw it in 1860 or 1861, I think. I have since been informed that Mr. McKay had the McKenzie form of furnace introduced in his oven. I have no knowledge of any Ball oven except the two mentioned.

X 20. Wherein did the four ovens used by you, which you say were heated by the process known as the Allen and Pick patent, differ from the Ball oven used by Mr. Anderson?

A. There was no heating chamber over the furnace in mine, but the product of combustion passed directly from the furnace through the side apperatures in the furnace and communicated with pigeon-holes in the side wall of the baking chamber, through which the product of combustion entered the baking chamber.

X 21. After McKenzie made the changes in your ovens and built the new oven under his patent, were you sued by Hosea Ball in the circuit court of the United States for the southern district of New York, and a decree entered in that suit declaring the ovens used by you to be an infringement of letters patent reissue granted to said Ball?

A. Yes.

JOHN T. WILSON.

PETER O. ANDERSON, a witness produced on behalf of the
108 complainant, being first duly sworn, deposeth and saith, in answer to interrogatories propounded to him by Sanford H. Steele, of counsel for the complainant, as follows:

Q. 1. State your name, age, and residence, and occupation.

A. Peter O. Anderson; age, 37; residence, Brooklyn, N. Y.; occupation, the Old Dominion Steamship Compnay.

Q. 2. What was your occupation from 1855 to 1865?

A. I was in the baking business in the city of New York, at No. 219 Fulton st., in Peter B. Anderson's employ.

Q 3. What sort of ovens did you use in that establishment?

A. We used two tile ovens. At first we had a reel oven put in by Hosea Ball in 1856.

Q. 4. Describe briefly the construction of the reel ovens.

A. That oven was a reel oven. It was heated by a furnace on the street floor; it was not in the cellar. There was a fire chamber; it was 2 by 6, and over the fire chamber there was an arch, about 8 by 12, with a six-inch spring. The heat passed under the flat arch, through a partition wall, into an exterior chamber. That chamber was divided from the baking chamber by a wall 4 inches thick. That wall was full of pigeon-holes from the top of the arch I described. The baking chamber contained eight hanging pans, hanging on the arms of the reel.

Q. 5. Down to what time did you continue to use this oven substantially as described?

A. We used it until the arch fell in.

Q. 6. State, as near as you can remember, when the arch first fell in.

109 A. In May, 1858.

Q. 7. Was that arch rebuilt?

A. Yes, sir.

Q. 8. By whom?

A. I couldn't tell the man's name. Mr. McKenzie (Duncan) was the man sent for. Mr. McKenzie furnished a man; he couldn't attend to it himself.

Q. 9. Was there any change made in rebuilding the arch; and, if so, what?

A. Not by this man.

Q. 10. Down to what time did you continue to use the arch substantially as rebuilt by Hosea Ball?

(Question withdrawn.)

Q. 11. How long did this arch stand?

A. Stood long enough to light a fire, and then the arch fell in.

Q. 12. Was it rebuilt again; and, if so, by whom, and how soon?

A. Yes, sir; it was rebuilt by Mr. McKenzie in two days; we had to wait for him.

Q. 13. Was there any change made in rebuilding the arch this time; and, if so, what change?

A. The arch was rebuilt by giving it a little more spring than it originally had, and by putting pigeon-holes in the arch over the fire.

Q. 14. State the location and size of these pigeon-holes as nearly as you remember.

A. They were distributed promiscuously through that portion of the arch which was over the fire.

Q. 15. Down to what time did you continue to use this arch substantially as rebuilt by Mr. McKenzie?

110 A. We used that oven until some time in August, 1858.

Q. 16. Was a change made in the arch at that time; and, if so, what change, and under what circumstances was it made?

A. The oven then had a cast iron shaft in it—that is all the change, which broke off from the hub. We then took all the pigeon holes out the sides, and put in a small arch; it was about two foot wide, 6 or 7 feet long—I can't tell exactly—12 inch spring, and then took and put in two new extra arms, and one new pan, making it a nine pan oven instead of eight, leaving the fire door where it originally was.

Q. 17. Was any change made in regard to the holes connecting the heating chamber and the baking chamber, which you state were put into the arch when Mr. McKenzie rebuilt it?

A. They were stopped up, a few of them, we got too much bottom heat; three or four were stopped up.

Q. 18. When was this change made stopping up some of the holes?

A. Two or three days after it was put in.

Q. 19. Describe as well as you remember, the location and dimensions of these holes through the arch, as put in by Mr. McKenzie, in the arch built by him.

A. The holes were directly over the fire, some in the back end and some in the front end of the furnace. The dimensions were the width of a fire brick, and probably a quarter of a length of one.

Q. 20. Is the Mr. McKenzie spoken of Mr. Duncan McKenzie?

A. Yes, sir.

Cross-examination by Mr. EDWARD BOYD:

111 X Q. 1. What season of the year 1856 was the Ball oven put in for your father?

A. I couldn't tell you—I couldn't say—but probably in the summer.

X Q. 22. Then it would be some time in the second spring thereafter that the arch fell down, would it not?

A. It fell in about May, 1858. Yes, of course it was in the second spring.

X Q. 23. What was your particular occupation between 1856 and 1859?

A. Engineer.

X Q. 24. I noticed that in the matter of the application for an extension of Duncan McKenzie's patent, your father testified that he didn't adopt the McKenzie improvement until 1859, and that he is quite sure it was in the summer of 1859, and you are asked whether you think that he is not more likely to have been correct than you are?

A. I don't think that he would have any better means of knowing than me.

X Q. 25. What are your means of knowledge?

A. There was a dissolution of partnership the 30th day of April, 1858, and my father had the place to himself; the firm was Peter B. Anderson; then we went to work and fixed things in general to suit ourselves.

X Q. 26. But the change was a necessity, was it not, by the falling of the arch?

A. Yes, sir.

X Q. 27. Then in what way does the dissolution of the partnership enable you to fix the date of the rebuilding by McKenzie?

A. Mr. McKenzie had frequently submitted plans of his oven to my father at his residence in Brooklyn, before this dissolution, in my
112 presence, and wanted to change the oven, and agreed to change it; and if he did not do as he represented he would put it back where he found it, and wouldn't charge him a cent. Mr. McKenzie put up the temporary arch, until business season would permit us to make a permanent change; that is the only means of knowing the time that Mr. McKenzie wanted me to take an interest in the oven, and I wouldn't do it.

X Q. 28. When did Mr. McKenzie want you to take an interest with him; after or about the time he obtained his patent?

A. I think it was about a week after he made the change. I don't know whether he had the patent or not.

X Q. 29. Have you examined any book entry or other writing for the purpose of refreshing your memory as to dates?

A. No, sir.

X Q. 30. Were entries made on the books of the firm relating to the rebuilding of this oven?

A. There was a cash book kept showing disbursements and receipts. I cannot answer the question. Of course on that cash book entries appear showing brick, lime, mortar, &c.

X Q. 31. Who had custody of these books on the 4th of March, 1874?

A. I presume my father had them; he was out of business.

X Q. 32. What would the effect have been if instead of stopping up some of the holes in the arch as described in your answer to question 16, the number of these holes had been increased, or the whole
113 top of the arch removed?

(Question objected to on the ground that this witness does not profess to be qualified as an expert in ovens, but states that he was then an engineer.)

A. The result would have been that it would have burnt up everything that you put in, on account of carr'ing too much bottom heat.

X Q. 33. Are you as certain about the date of the erection of Ball oven as you are about the other dates which you have given?

A. No, sir; I am not so certain about that. The firm put up the Ball oven in 1856.

Redirect by Mr. STEELE:

Q. 34. Are you the executor of your father's will?

A. Yes, sir.

Q. 35. Have you in that capacity had occasion to refer to your father's books, and if so, how often and how recently?

A. No occasion to look to his business books for 8 years.

Q. 36. Have there been any transactions or suits at law connected with the settlement of that estate that have required you to become familiar with the dates of his business transactions or any of them, during 1858?

A. No more than what I have stated. I knew as much about this business as he himself after 1868. I don't learn what I have said from referring to the books.

PETER O. ANDERSON.

DAVID FITHIAN, a witness produced on behalf of the complain-
114 ant, being first duly sworn, deposeth and saith, in answer to interrogatories propounded to him by Sanford H. Steele, of counsel for the complainant, as follows:

Q. 1. State your name, age, and residence, and occupation.

A. David Fithian; age, 67; residence, Brooklyn, N. Y.; occupation, door, sash, and blind manufacturer.

Q. Please examine complainant's exhibit McKenzie drawing, and state whether you have seen the same before; and, if so, when and under what circumstances?

A. I saw it at the date I signed it; on the 3rd day of March, 1858.

Q. The name of David Fithian, on that certificate, is your signature, is it?

A. Yes, sir.

Q. Did you see Samuel W. Osmun sign the same at the same date?

A. Yes, sir.

Q. The certificate bore that date before you signed it, did it not?

A. Yes, sir; I have no doubt of it. I am not in the habit of signing documents or papers without seeing when they are dated.

(The three preceding questions objected to by respondent's counsel as leading.)

Q. State whether the certificate of Samuel W. Osmun on said exhibit which you appear to have witnessed, was dated at the time you witnessed the same, if you know.

A. It was wrote at the time by Mr. Osmun at his office.

Q. Was it dated at that time, if you know?

A. It was written at that time, and of course it must have been
115 dated, to the best of my knowledge and belief.

Cross-examination by Mr. EDWARD BOYD:

Q. Do you know where the specification is mentioned in the certificate by you?

A. I do not.

Q. Without the specification can you, simply by looking at the drawing before you, describe the features which are certified as being original?

A. No, sir.

Q. Have you any independent recollection of the signing on this drawing?

A. I recollect being called in to sign it and reading what was wrote in my presence.

Q. Do you recollect when this was, independent of what appears on the paper?

A. No, sir; I should have said 18 or 20 years ago.

DAVID FITHIAN.

SAMUEL W. OSMUN, a witness produced on behalf of the complainant, being first duly sworn, deposeth and saith, in answer to the interrogatories propounded to him by Sanford H. Steele, of counsel for complainant, as follows:

Q. 1. State your name, age, and residence, and occupation.

A. Samuel W. Osmun; residence, Brooklyn, N. Y.; age, 57; occupation, architect, and builder occasionally.

Q. 2. Will you look at complainant's exhibit McKenzie drawing, and state whether you have seen it before?

A. I have seen it before.

Q. 3. Examine the name Samuel W. Osmun whereon, and state whether that is your signature.

A. It is.

116 Q. 4. State when, where, and under what circumstances you signed it.

A. I signed it at my office at 26 Hoyt street, near Livingston, in Brooklyn, on the 3rd day of March, 1858.

Q. 5. In whose handwriting is the certificate signed by you, commencing "this is to certify," etc., and the date March 3rd, 1858, if you know?

A. It is my own handwriting.

Q. 6. Was that date placed upon the drawing by you at the time you signed it?

A. Yes, sir; it was.

Cross-examination by Mr. EDWARD BOYD:

X Q. Where is the specification referred to in this certificate, signed by you on the exhibit McKenzie drawing?

A. I do not know.

Q. What are the features which you certify as believing to be original?

A. The drawing which accompanied this certificate and the specifications which accompanied it; I don't know what they were.

Redirect by Mr. STEELE:

Q. At whose request did you sign that certificate?

A. Duncan McKenzie.

SAMUEL W. OSMUN.

FRANK MILLWARD, a witness produced on behalf of complainant, being first duly sworn, deposeth and saith, in answer to interrogatories propounded to him by Rob't H. Parkinson, esq., of counsel for the complainant, as follows:

117 Question 1. State your name, age, residence, and occupation.

Answer. Frank Millward; age, 42 years; residence, Ludlow, Kentucky; occupation, solicitor of patents and mechanical engineer.

Int. 2. Are you the person of the same name who has formerly testified in this case?

Ans. I am.

Int. 3. Please examine the following exhibits of the defendants, Exhibit Jennison patent, being patent granted to George C. Jennison February 1st, 1859, for improvement in ovens; second Exhibit Jennison reissue, being reissue 4783, granted said Jennison Dec. 5th, 1872; Exhibit Smith English patent, being English patent granted James Smith March 9th, 1854, for improvement in baking ovens; Exhibit Ficars' English patent, being English patent granted to T. & T. Ficars December 22d, 1862, or '52, for improvement in baking ovens; Exhibit Sellique patent, being French patent granted Alex. F. Sellique Sept. 24th, 1829, for improvement in baking ovens; Exhibit Covelet oven, being French patent, M. Covelet June 13th, 1846, for improvement in baking ovens; Exhibit Corret patent, being French patent granted M. Corret March 31st, 1840, for improvement in bake ovens; Exhibit John Ball patent, being English patent granted John Ball November 12th, 1850, for improvement in ovens, and say whether or not you understand the same.

Ans. I have; I believe I do.

Int. 4. Please compare the defendant's Exhibit Smith English patent with complainant's Exhibit Ball reissue, and say whether or not you find described or shown in said Smith English patent the invention described in the Ball reissue and claimed in the first claim

118 thereof, and give your reasons fully for any opinion you may express.

Ans. I have carefully compared the device specified in said Smith English patent with the oven shown in the Ball reissue, and am of the opinion clearly that the said Smith English patent does not embrace the invention or improvement specified in the first claim of the Ball reissue. I have before stated in this case that the improvements first claimed in the Ball reissue is substantially composed of three (3) principal elements, to wit, a furnace, a bed chamber, and a rotating reel, the reel having swinging bread-holders suspended from the arms or end plates thereof, & the furnace so arranged and connected that the products of combustion will pass into or through the chamber within which the bread-holders move. The Smith English patent does not show this combination of elements. It exhibits a wholly different organization, the parts of which are arranged to operate in a substantial different manner from the Ball oven. The Smith oven has no reel and no swinging bread-

holders rotating within a bread chamber; but it has a chain carrier fitted with plates of metal lying side by side, so as to form the bottom of the oven; and against this bottom the heat from the furnace impinges, flues being arranged above the endless carrier to convey the heated gases to some extent above the bread. It is true that, owing to these flues, that the bread receives to some extent direct heat by a circuitous line of communication, but it is mainly baked by heat received by conduction and radiation from the plates of the endless carrier, which forms the bottom of the oven, owing to the fact that the Smith English patent has no swinging bread-holders suspended from the arms or end plates of a rotating reel. I am of the opinion, as before expressed, that it does not contain the improvement specified in the first claim of the Ball reissue No. 4026.

Int. 5. Please say whether or not you find in the defendant's Exhibit Ficars' English patent the invention described in the Ball reissue
119 and claimed in the first claim thereof, and give your reasons fully for your opinion.

Ans. I do not. The Ficars patent exhibits a baking device having a number of baking chambers arranged horizontally one above the other and communicating with a furnace below them, and the bread to be baked is carried into the chamber on false bottoms or platforms mounted on wheels or rollers. This patent does not show or describe any swinging bread holders suspended from the arms or end plates of a rotating reel, and I therefore say that it does not contain the improvement specified in the first claim of the Ball reissue.

Int. 6. Please say whether or not you find in the defendant's Exhibit Sellique patent the invention described in the Ball reissue and claimed in the first claim thereof, and give your reasons fully for your opinion.

Ans. I do not find that this patent embraces the improvement referred to, for the reason that it has no swinging bread-holders suspended from the arms of a rotating reel. It is simply an oven having a vacant chamber receiving direct heat from the furnace, the bread resting on trays which are slid into the mouth of the chamber & rest on the bottom of said chamber during the operation of baking. These bread-holders, like those shown in the last patent referred to, the Ficars, do not move during the operation of baking, and the oven, as a whole, has no more similarity to the Ball oven than the old Dutch oven has, except that the fire is continued during the operation of baking. This Sellique oven does not, as I have before stated, contain the combination expressed in the first claim of the Ball reissue, and it has no practical or substantial resemblance thereto in construction or operation.

Int. 7. Please say whether or not you find in the defendant's Exhibit Covelet oven the invention described in the Ball reissue & claimed in the first claim thereof, & give your reasons fully for your opinion.

Ans. I have stated in answer to question 3 that I understood this among other exhibits as far as this one is concerned and the Exhibit Corret patent. I wish to be understood that I understand it so far as it is described and shown definitely. In the one now inquired about, I find but one figure in the drawing, & it is numbered figure 7, and the description is an extract from "Le Yenie Industrial Review Des Inventions Francaises et Etrangeres"; and the extract refers to the improvement illustrated as an improvement upon the plans of Corret, Sochet, and Bironneau, which are not described or shown therein. I am unable, therefore, to judge as to the construction differently of the device shown in this exhibit, as it is impossible to show it differently in the only figure that is given, and the description does not go into particulars as to

construction. It is stated, however, in the description that the furnace or firep'ace has no communication with the oven, and this is sufficient, of course, to show that it does not embrace the improvement specified in the Ball reissue, which requires, among other things, that the
120 furnace shall be so connected that the products of combustion shall pass into or through the bed chamber. For this reason alone, no matter what the construction of the reel may be, if it was so fully illustrated as to exemplify its full construction, I am of the opinion that this Exhibit Covelet patent does not contain the improvement specified in the first claim of the Ball reissue. How the construction of the reel shown in the Ball reissue compares with the bread-carrier shown in the illustration in the Covelet exhibit I am unable to say, for the reason that the latter does not fully illustrate it and the description does not fully describe it. It is impossible to discover from it what the actual construction of the bread-holders is, nor can it be said whether there are arms at each side of the furnace to suspend the bread-holders from, and the presumption that they are suspended at all can only be arrived at from inference, as the description does not speak of it.

Int. 8. Please say whether or not you find in the defendant's Exhibit Corret patent the invention described in the Ball reissue & claimed in the first claim thereof, & give your reasons fully for your opinion.

Ans. I do not. The exhibit Corret patent is so very indefinite, both in description and drawing, that it is difficult, if not impossible, to tell from it what the construction of the device is which carries the bread, but sufficient is indicated to show that the chamber which contains the bread is not stationary, like that shown in the Ball reissue, but is arranged to revolve, & that the gases from the furnace do not enter this chamber at all, as they are required to do in the Ball, but that the Corret oven is one heated wholly by application of heat to the exterior thereof, the bread being baked by radiation from the shell of the oven. For the reason, therefore, that the furnace or fireplace of the
121 Corret oven is not connected with the chamber in which the bread is placed, so that the products of combustion will pass into or through said chamber, I am of the opinion that the said Corret patent does not embrace the improvement specified in the first claim of the Ball reissue.

Int. 9. Please say whether or not you find in the defendant's exhibit John Ball's patent the invention described in the Ball reissue, & claimed in the first claim thereof, & give your reasons fully for your opinion.

Ans. I do not. The exhibit Ball patent is simply a device for the better heating of bakers' ovens, & consists of an arrangement of flues by which the bottom of the oven, as well as the sides and crown, are heated before the gases escape into the chimney. There is no description of how the bread is to be baked therein, and there is no provision for separate bread-holders at all, & it is presumable that it is intended to heat the oven first, & then put out the fire before the bread is introduced. I see no resemblance between this patented device & the improvement specified in the Ball reissue as set forth in the first claim thereof.

Int. 10. Please state whether or not, in your opinion, in view of the state of the art as illustrated by the defendant's exhibits, to which you have just been referred, it would require invention to construct an oven corresponding to the first claim of the Ball reissue, & give your reasons fully for your opinion.

Ans. I am of the opinion that it would require invention of the high-

est order, even admitting that the Corret and the Covelet ovens show reels which are not substantially different from the reel in the Ball oven.

This, however, I do not admit, for the reason I have given with
122 reference to the Covelet, & as to the Corret to avoid being misunderstood. I would add that it would be impossible from that exhibit to determine the construction of the bread-carrier, as the two figures do not agree in themselves in representing it in one of the figures. The arm of one of the bread-carriers seems to be attached to the rotating shell of the oven, whereas the description says that the oven may be rotated independently of the bread-carrier. I say, admitting, however, that these two exhibits do show reels, it would require invention to combine therewith a furnace & bread-chamber of different construction & operation, such as is shown in the Ball reissue, which sets forth as a special requisite that the furnace shall be so arranged & connected that the products of combustion shall pass into and through the chamber in which the bread-holders move. My reasons for this opinion are that it would require, in my opinion, an original mental conception of such a combination and mechanical adaptation of such a furnace and chamber with such moving bread-holders, and the adaptation would have the effect of combining in one apparatus the advantages incident to that peculiar device for moving the bread, and the advantages incident to the introduction of the gaseous products directly into the chamber in which the bread-holders move.

Int. 11. Please say whether or not you find in the defendant's exhibit Jennison patent, the invention described in the McKenzie reissue and specified in the first claim thereof, and give your reasons for your opinion.

Ans. I have stated in my previous examination that one of the essential features of the improvement specified in the first claim of the
123 McKenzie reissue is, to use the language of the patent, a rotating reel located within the baking chamber, and provided with gravitating pans or shelves arranged or hung around the shaft of said reel from rods attached to the end of plates or arms thereof. This construction of reel is not shown or described in the Exhibit Jennison Patent, and this reason alone is sufficient for the opinion, which I now express, that said Exhibit Jennison Patent does not embrace the combination expressed in the first claim of the McKenzie reissue. The device which moves the bread in the Jennison patent is composed of two endless chains, suspended so that they mainly hang vertically in the bread chamber and plates or trays attached thereto, the chains running over sprocket wheels journaled in the walls of the oven. The McKenzie reel provides for the suspension of the bread trays directly to the arms or end plates of the reel of this construction, prevents a row of pans being interposed one above another between the furnace and the top of the oven, and avoids therefore the objectionable consequences attending such arrangement of exposure of the pans or shelves to the action of the heat. It is true that the line of communication for the products of combustion between the furnace and the bread-chamber is as direct in the Jennison patent as it is in the McKenzie patent. But in view of the fact that the Jennison does not contain the construction of reel particularly described in the language of the first claim of the McKenzie reissue, or any mechanical equivalent thereof in construction & operation, I am of the opinion that the said Exhibit Jennison Patent does not either describe or show the improvement specified in the said first claim of the McKenzie reissue No. 6397.

124 Int. 12. Please say whether or not you find in the defendant's

Exhibits Smith's English Patent, Vicars' English Patent, Sellique Patent, Covelet Oven, Corret Patent, or John Ball Patent, or either of them, the invention described in the McKenzie reissue and specified in the first claim therein, and give your reasons fully for your opinion?

Ans. I do not find in either of the above-mentioned exhibits the improvement in bake ovens which is specified in the said first claim of the McKenzie reissued patent. In the Smith English Patent there is no suspended bread pans or shelves at all, and there is no shelves arranged to rotate from the ends of the arms of a reel such as McKenzie makes essential in the construction of his device. Again McKenzie sets forth that the line of communication between the furnace and the chamber in which the bread moves while being baked must be direct. It is not so in the Smith patent. The heat in the Smith patent, reaching the bread-plates on the under side from the side flues, communicating with the furnace and reaching the space above the bread also from side flues. Owing to the absence in the Smith patent of these two requisites, to wit, the reel with its suspended shelves and the furnace having a direct communication with the bread chamber, either of which would be sufficient to render the Smith device a substantial departure from the McKenzie device, I am of the opinion that the said Smith patent does not embrace the improvement specified in the first claim of the McKenzie reissue. I do not find that the Vicar's patent embraces the improvement specified in said first claim for the reason mainly that it has no bread pans or shelves suspended from the arms of the rotating reel, which
125 the McKenzie absolutely requires shall be present; in addition to this the Vicar's patent does not have the direct line of communication between the furnaces and the bread, the Vicar's being as a whole a differently organized apparatus, having stationary shelves or false bottoms upon which the bread is baked, my answer to the Vicars applies equally to the Selique patent in every respect, as there is no difference between them so far as they approach the construction of the McKenzie device. I do not find the McKenzie improvement either in the Corret or Covelet Exhibits for the reason that neither of them has a bread chamber with which the gases from the furnace communicate directly or indirectly, and it is one of the essential requisites of the McKenzie improvement that the gases from the furnace shall not only enter the chamber in which the bread shelves move but that the line of communication shall be direct. There is nothing in the John Ball English patent which at all approaches in construction or operation the improvement referred to in the first claim of the McKenzie patent, the John Ball being simply a device for heating an ordinary oven, in which bread is apparently placed after the fire is put out.

13. Int. Please say whether or not in your opinion, keeping in view the state of the art as illustrated by the defendant's exhibits to which you have been referred, it would require invention to construct an oven corresponding to the first claim of the McKenzie reissue, and give your reasons fully for your opinion?

Ans. It requires invention in my opinion in every case to conceive of a combination of old elements and mechanically adapt the ele-
126 ments to each other so that when so combined they may co-operate in effecting the operation intended either in an increased degree of efficiency or a different operation in kind. I am therefore of the opinion that in view of the state of the art which has been submitted to me it would require invention to conceive and complete the mechanical organization specified in the first claim of the McKenzie reissue.

14. Int. Please examine respondent's exhibit Covelet model and say

whether or not you find such a device described or shown in the defendant's exhibit Covelet oven and give your reasons fully for that opinion.

Ans. I have stated before that the exhibit Covelet oven shows but one figure in the drawing. In order to construct the model, the respondent's exhibit Covelet model, it would be necessary to imagine or conceive of certain constructions which could only be shown by a figure of a drawing which doesn't exhibit in the Covelet exhibit. There is no indication in the Covelet exhibit as to how the furnace is located with reference to the depth of the furnace. It is shown as extending half way in the model; there is no indication in the exhibit as to how or what place the furnace communicates with the heating pipes and chimney. The model, however, shows a connection which extends from the furnace around the sides of the bread chamber and to the chimney complete. Three of the pipes in the drawing of the Covelet exhibits are apparently indicated as extending two upward and one downward vertically at the end of the furnace. The pipes are not so shown in the model. These vertical pipes to which I refer are shown by white space in the drawing, that is if they are pipes, and this cannot be determined exactly the drawing being so incomplete. Again, the exhibit says that there are two cross-bars to receive suspension shafts. There are four such cross-bars in the model, two at each end. There is no indication in the Covelet exhibit as to what portion of the depth of the furnace the bread bans occupy; but in the model they are shown as extending entirely across the oven. In the model also I find an apperature through the curved surface of the shell of the oven for the entrance and discharge of bread apparently. This is not shown in the Covelet exhibit. The defendant's Exhibit Covelet model, therefore, cannot be said to be an embodiment simply of what is shown and described in the Exhibit Covelet oven, as it contains many features of construction which are not alluded to in said exhibit. The Exhibit Covelet oven is so imperfect that it is impossible for any person to make a model from it without drawing upon his imagination very largely.

127

FRANK MILLWARD.

DEPOSITIONS FOR RESPONDENTS.

JAMES HALL, a witness produced on behalf of the respondents, being first duly sworn, deposeth and saith, in answer to interrogatories propounded to him by EDWARD BOYD, esq., of counsel for the respondents, as follows:

Question 1. State your name, age, residence and occupation?

Answer. My name is James Hall, age 38, residence Buffalo, N. Y., occupation oven builder.

Q. 2. State the length of time you have been a builder of ovens, together with the various kinds you have built?

A. I have been a builder of ovens full twenty years; I built the old fashioned wood ovens, also the old fashioned oven heated by radiation and the McKenzie reel ovens; I built my own reel oven too.

128

Q. 3. State how generally you have personal knowledge of the different kinds of bake ovens in use in this country employing mechanical devices for carrying material to be baked?

A. Well, I know of the McKenzie, the Ball oven, the Crumbie oven, and the Bail and Kennedy ovens.

Q. 4. State whether or not you are acquainted with all of these classes in use?

A. I am.

Q. 5. Look at Exhibit "Ball model" and say whether you understand it, and if so whether you know of any constructed like it being in use; if so, how many.

(Objected to as irrelevant and incompetent.)

A. I know of one being in use in Milwaukee, Wis., seeing from the oven mouth to the furnace door it was just like this model.

Q. 6. Do you know of any others?

(Same objection.)

A. I know of one in New Orleans which they call a Ball oven, but as far as I can see it worked on the McKenzie principle.

Q. 7. Do you know of any other?

(Same objection.)

A. No.

Q. 8. Describe how the crown over the top of the furnace in this New Orleans oven, which you say worked on the McKenzie principle, was made?

A. It had an arch over the whole bottom of the oven; it had pigeon holes perforated through what we call the floor of the oven similar to McKenzie's oven.

129 Q. 9. Look at complainant's exhibit "McKenzie reissue" and say whether you understand the construction of the oven there shown and described.

A. I have examined it, and understand the same.

Q. 10. State whether you have seen ovens which had been constructed substantially in accordance with that patent.

A. I have, and constructed them myself with McKenzie's consent.

Q. 11. If you have any knowledge of ovens constructed under the McKenzie patent having been afterwards changed, state the nature of such changes, and why they were made.

A. I have. I have altered two ovens in G. K. Withington & Co.'s; I altered one in Ed. Bennet's bakery. I tore down and rebuilt it in John J. Perkins & Co.'s place. The alterations were made on account of the economy in fuel saved in a open furnace over the covered furnace, and the continual repairs necessary for the covered furnace.

Q. 12. What is about the difference in cost of construction of the chamber and furnaces between the open furnace and the McKenzie?

A. The difference is from three to five hundred dollars, according to the size of the oven, in favor of the open furnace.

Q. 13. What are the advantages of either as to the economy of management and repairs?

A. The open furnace will burn less fuel about from 20 to 30 per cent. saving over the covered furnace. For repairs in the open furnace I have never had anyt o do yet; the first one built in this city is now in use 6 years past, and has not cost one cent for repairs yet, where

130 a covered furnace can't run over two years without more or less repairing, and in three or four years it has to have a complete overhauling.

Q. 14. What kind of an oven do you mean by a covered furnace?

A. McKenzie's oven.

Q. 15. How will material baked in the open oven compare with that baked in the McKenzie oven as to quality?

A. The baking qualities are the same.

Q. 15. What I want to know is whether there is any substantial difference in the quality of the material baked which is due to the differences in the ovens?

A. There is no difference in the quality.

Q. 17. Are you familiar with the two reel ovens used by the defendants at St. Louis?

A. I am.

Q. 18. Look at the model now shown you and state how it represents said ovens, regardless of the number of shelves of the reel.

A. This is a perfect model of the defendants', excepting that there is two furnaces, and that the end is closed.

Q. 20. Have you any knowledge of a process of baking bread in closed vessels so as to retain the gases or moisture in the bread? If so, describe it.

(Objection.)

A. I have seen bread baked in covered pans, which is a pan with an air-tight cover; the dough is put into the pan, the cover put down tight and then it is put into the oven to be baked.

Q. 21. How does the price which such bread commands in the market compare with that baked according to the McKenzie plan?

A. The steam bread always commands the highest price of any
131 bread in the market. I mean the covered pan bread.

Q. 22. What is the difference, if any, in quality of the two kinds of bread?

A. The covered pan is sweeter than the other, and, I think, better.

Q. 23. What do you know, if anything, about users of open ovens like those of defendants' introducing steam into the oven during the process of baking?

A. Snider Bro's of this city introduced waste steam into a sheet iron drum perforated with holes, the drum as set in the bottom of the oven; when they want the steam they turn it into this drum and it escapes into the oven.

Q. 24. Do you know of any others who during the process of baking introduced steam into the oven?

A. I do. D. Forester, of this city, has a steam pipe running across the top of the oven mouth. This pipe is perforated with holes, so that when the reel commences to revolve they turn on live steam.

(Respondent's counsel here offers in evidence the model above referred to, and marks it "Dozier oven.")

Cross-examination:

X Q. 25. Who built the ovens now and for one or two years past in use by the defendants in this case?

A. I did.

X Q. 26. Are you the owner of a patent under which they purport to be built?

A. I am.

X Q. 27. What is the most common size for the Hall oven?

A. The ten pan oven shelves, 3 feet wide, eight feet long.

X Q. 28. What is the usual cost for such an oven?

132 A. At present I am putting them in for 1.900 dollars, all complete, ready for baking.

X Q. 29. Does this include the cost of material?

A. This includes the whole cost from the foundation to the complete finish of the oven, me to furnish all material.

X Q. 30. What was the cost of the same oven (18) eighteen months ago?

A. $2,250 was about the average cost.

X Q. 31. Are you interested in this defense of this suit?

A. No, I am not.

X Q. 32. Will not your interest under the patent be effected by the result of the suit?

A. If the suit goes against Dozier, Weyl & Co., I have no doubt but what it will be effected.

X Q. 33. Have you contributed or do you expect to contribute to the expense of defending this suit?

A. I have not nor don't expect to.

JAMES HALL.

JAMES HALL, recalled, deposes as follows:

Q. 1. State whether you are personally acquainted with Duncan MacKenzie, named in complainant's exhibit MacKenzie reissue.

A. I am.

Q. 2. If at any time you suggested to him the practicability of making an oven without a cover to the furnace, you will please state when, the circumstances, and what he said, if anything.

A. In 1862, when McKenzie was putting up his first reel oven in this city, I suggested to him to leave the cover off the furnace and have a fire in the bottom of the oven. MacKenzie said, "Good God, Jimmy, you would burn all the iron up in the oven." I said, "You didn't want
133 to burn the iron, but only to bake dough." He said that when I live to be as old as him that I would know something.

Cross-examination:

X Q. State definitely where you were and who was present when the conversation to which you refer occurred.

A. The shop was in this city *in this city*, in the heart of the square bounded by Front and Second streets, Main and Sycamore streets. The parties that were present—I can't recollect their names; can't say as they heard our conversation, for Mc. and I were talking about different things that didn't concern anybody.

X Q. 2. Whose shop was it?

A. The shop was owned by Samuel Cloon.

X Q. 3. Was the oven built for him?

A. It was.

X Q. 4. Were you assisting Duncan McKenzie in building this oven?

A. Yes.

X Q. 5. Did you assist him in building other McKenzie ovens prior to the time you built the first oven like that shown in your patent? I refer to your patent of Oct. 11, 1870.

A. Yes.

X Q. 6. When did you build the first oven substantially in accordance with that described in your patent?

A. I built it May, 1870, in this city, for John Bailie.

JAMES HALL.

1. Respondent's counsel offers in evidence the following: Transcript from the circuit court of the United States for the southern district of Ohio in cause No. 1671, in which Hosea Ball was complainant
134 and Geo. K. Withington and O. M. Langdon were defendants.

2. Letters patent No. 15753, granted to Hosea Ball Sep. 23d, 1856, for improvement in ovens, and marks it Defendant's Exhibit, Ball's original patent; also certified duplicate from the U. S. Patent Office of the model filed with the application of said Hosea Ball for said patent, marked Defendant's Exhibit Ball model.

3. Letters patent No. 22809, granted to George C. Jennison, Feb'y 1st, 1859, for improvement in ovens, marked Exhibit Jennison Patent; also, reissue No. 4783, granted to said Jennison, Dec. 5, 1872, as a reissue of said last-named patent, marked Defendant's Exhibit, Jennison Reissue; also, a certified copy of the commissioner's decision in the matter of the application of said Jennison for the extension of said letters patent, marked Defendant's Exhibit, Jennison Extension.

4. Certificate from the records of the United States Patent Office of copy of English letters patent No. 562, granted to James Smith for improvement in baking ovens, March 9th, 1854, marked Defendant's Exhibit, Smith English Patent; also, model of same, marked Defendant's Exhibit, Smith's Model.

5. A like certificate of English letters patent No. 1138, granted T. & T. Vicars, Dec. 22d, 1852, for improvement in baking ovens, marked Defendant's Exhibit, Vicars English Patent; also, model of same, marked Vicars Model.

6. A like certificate of French letters patent, granted Alex. F. Sillique, for improvement of baking ovens, Sep. 24, 1829, marked Defendant's Exhibit, Sellique Patent; also, model of same, marked Sellique Model.

135 7. A like certificate of French letters patent granted to M. Covelet, June 13th, 1846, for improvement in bake ovens, marked Defendant's Exhibit, Covelet Oven; also, a model of the same, marked Covelet Model.

8. A like certificate of French letters patent, granted to M. Corret March 31st, 1840, for improvement in bake ovens, marked Defendant's Exhibit, Corret Patent.

9. A like certificate of English letters patent, granted to John Ball, Nov. 12th, 1850, for improvement in ovens, marked Defendant's Exhibit, John Ball Patent.

(Complainant objects to the introduction of the foregoing exhibits as irrelevant and incompetent.)

The transcript of record referred to above is in the words and figures following, to wit:

Transcript of record from the circuit court of the United States for the southern district of Ohio.

At a stated term of the circuit court of the United States within and for the sixth judicial circuit and southern district of Ohio, begun and held at the court-house in the city of Cincinnati on the first Tuesday of October, being the sixth day of that month, in the year of our Lord one thousand eight hundred and seventy-four, and of the Independence of the United States of America the ninety-ninth.

Present, the Honorable Phillip B. Swing, one of the judges of said court.

Among the proceedings had were the following, to wit:

HOSEA BALL, COMPLAINANT,
versus
GEORGE K. WITHINGTON AND OLIVER M. Langdon, defendants. } In equity.

Be it remembered that heretofore, to wit, on the eleventh day of October, in the year of our Lord one thousand eight hundred
136 and seventy-two, came the said complainant, by his solicitors,

Fisher and Duncan, and filed in the clerk's office of the court aforesaid his certain bill of complaint against the said defendants, clothed in the words and figures following, to wit:

Circuit court of the United States for the southern district of Ohio.
In equity.

HOSEA BALL
versus
GEORGE K. WITHINGTON AND OLIVER M. Langdon.

To the honorable the judges of the circuit court of United States for the southern district of Ohio:

Hosea Ball, a citizen of the State of New York, and residing at New York, in said State, brings this bill of complaint against George K. Withington and Oliver M. Langdon, citizens of the State of Ohio, and residing at Cincinnati, in said State, and thereupon your orator complains and says that your orator was the original and first inventor of an improvement in ovens, fully described in the letters patent hereinafter mentioned, and which had not been known or used before his said invention, and which was not at the time of his application for a patent, as hereinafter mentioned, in public use or on sale with his consent or allowance.

And your orator further shows unto your honors that he being so as aforesaid the first inventor and discoverer of said improvement, and being also a citizen of the United States, did on September 23rd, 1856, upon due application therefor, obtain letters patent of the United States for said invention, in due form of law, under the seal of the Patent Office of the United States, signed by the Secretary of the Interior, and countersigned by the Commissioner of Patents of the United States, bearing date the day and year last aforesaid, whereby there was granted and secured to your orator, his heirs, administrators or assigns, or intended so to be, for the term of fourteen years from and after the date of said letters patent, the full and exclusive right & liberty of making, constructing, using, and vending to others to be used the said invention and improvement, as set forth in said letters patent, which are now of record in the Patent Office, and by virtue whereof your orator became the sole owner of all the rights and privileges granted and secured, or intended to be granted and secured, in and by said letters patent, as by said letters patent now remaining of record in the Patent Office will fully appear.

137

And your orator further shows unto your honors that he having for a good and lawful cause surrendered said letters patent to the Commissioner of Patents, and having made due application therefor and having in all things complied with the acts of Congress in such case made and provided, did on the 12th day of October, A. D. 1869, obtain new letters patent, being for the same invention for the residue of said term, and which were marked Reissue No. 3666, and were issued in due form of law under the seal of the Patent-Office of the United States, signed by the acting Secretary of the Interior and countersigned by the Commissioner of Patents, and bearing date the day and year aforesaid, as by the said last mentioned letters patent now remaining of record in the Patent-Office will appear.

And your orator further shows unto your honorsthat he having for

138 good and lawful cause surrendered said reissued letters patent to the Commissioner of Patents, and having made due application therefor and having in all things complied with the acts of Congress in such case made and provided, did on the 14th day of June, 1870, obtain letters patent, being for the same invention, for the residue of said term, and which were marked Reissue No. 4026, and were issued in due form of law under the seal of the Patent-Office of the United States, signed by the acting Secretary of the Interior and countersigned by the Commissioner of Patents, and bearing date the day and year aforesaid, as by the said last mentioned letters patent or a duly certified copy thereof now brought into court will appear.

And your orator further shows unto your honors that on or about the 15th day of June, 1870, he made application for the extension of the term of said last mentioned reissued letters patent No. 4026, for seven years from and after September 23rd, 1870, and after full examination by the Commissioner of Patents the extension was granted and said letters patent were by the certificate of the said commissioner declared to have the same effect as if originally granted for twenty-one years, as by the said certificate of extension or a duly certified copy thereof now brought into court will fully appear.

And your orator further shows unto your honors that by virtue of the premises he became and now is the sole and exclusive owner of said last mentioned reissued letters patent and the inventions and improvements described therein, and of all the rights and privileges granted and secured or intended to be granted and secured thereby; and that

139 since he became the owner thereof as aforesaid he has invested and expended large sums of money, and been to great trouble in and about said invention, and for the purpose of carrying on the business of making and vending ovens containing his said improvements, and making the same profitable to him and useful to the public, and that said invention has been and is of great benefit and advantage; and that the public have generally acknowledged and acquiesced in the aforesaid rights of your orator; and your orator believes that he will realize and receive large gains and profits therefrom if infringements by said defendants and their confederates shall be prevented.

Yet the said defendants, well knowing the premises and the rights secured to your orator aforesaid, but contriving to injure your orator and to deprive him of the benefits and advantages which might and otherwise would accrue unto him from said invention after the issuing and reissuing of the letters patent as last aforesaid and before the commencement of this suit, did, as your orator is informed and believes, without the license or allowance and against the will of your orator and in violation of his rights and in infringement of the aforesaid last reissued letters patent No. 4026, unlawfully and wrongfully and in defiance of the rights of your orator, make and use ovens made according to and employing and containing said invention, and that they still continue so to do; and that they are threatening to make the aforesaid ovens and to bake bread therein in large quantities and to supply the market therewith and to sell the same, all in defiance of the rights acquired by and secured to your orator as aforesaid and to his great and irreparable loss and injury, and by which he has been and still is being deprived of great gains and profits which he might and other-

140 wise would have obtained, but which have been received and enjoyed and are being received and enjoyed by the said defendants by and through their aforesaid unlawful acts and doings.

And your orator further shows unto your honors, on information and

belief, that the said defendants have sold large quantities of bread which they have baked in said ovens, and have a large quantity on hand which they are offering for sale, and have made and realised large profits and advantages therefrom, but to what extent and how much exactly your orator does not know, and prays a discovery thereof, and your orator says that the use of the said invention by said defendants and their preparation for and avowed determination to continue the same and their other aforesaid unlawful acts in disregard and defiance of the rights of your orator have the effect to and do encourage and induce others to venture to infringe said patent in disregard of your orator's rights.

And your orator further shows unto your honors that he has caused notice to be given to said defendants of said infringements and of the rights of your orator in the premises and requests them to desist and refrain therefrom; but they disregarded said notice and refused to desist from said infringements and still continue to make and use said ovens as aforesaid.

And forasmuch as your orator can have no adequate relief except in this court, to the end therefore that the said defendants may, if they can, show why your orator should not have the relief prayed, and may according to their best and utmost knowledge, remembrance, information, and belief full, true, direct, and perfect answers make to the premises, and to all the several matters hereinbefore stated and charged as fully and particularly as if severally and separately interrogated as to each and every of such matters, and may be compelled to account for
141 and pay over to your orator the profits by them acquired and the damages suffered by your orator from the aforesaid unlawful acts.

And your orator prays that said defendants, George K. Withington and Oliver M. Langdon, their servants, agents, attorneys, and workmen, and each and every of them, may be restrained and enjoined provisionally and perpetually by the order and injunction of this honorable court from directly or indirectly making, constructing, using, vending, delivering, working, or putting into practice, operation, or use, or in anywise counterfeiting or imitating the said invention or any part thereof, or any ovens made in accordance therewith or like or similar to those which they have heretofore made, and that the said defendants may be decreed to pay the costs of this suit; and that your orator may have such further relief or such other relief as to this honorable court shall seem meet and as shall be agreeable to equity.

May it please your honors to grant unto your orator the writ of injunction, as well provisional as perpetual, issuing out of and under the seal of this honorable court, commanding, enjoining, and restraining the said defendants, George K. Withington and Oliver M. Langdon, and their servants, agents, attorneys, and workmen, and each and every of them, as is hereinbefore in that behalf prayed.

May it please your honors to grant unto your orator the writ of subpœna issuing out of and under the seal of this honorable court, directed to the said defendants, George K. Withington and Oliver M. Langdon, and each of them, commanding them by a certain day and under
142 a certain penalty to be and appear in this honorable court, then and there to answer the premises and to stand to and abide such order and decree as may be made against them.

And your orator will ever pray, &c.

HOSEA BALL.

FISHER AND DUNCAN,
Compl'ts Sol'rs & of Counsel.

UNITED STATES OF AMERICA,
Hamilton Co., Southern District of Ohio, ss:

On this 5th of October, 1872, before me personally appeared Hosea Ball, the above-named complainant, who, being by me duly sworn, deposes and says that he has read the foregoing bill of complaint subscribed by him and knows the contents thereof, and that the same is true of his own knowledge, except as to the matters therein stated on information and belief, and as to those matters he believes it to be true.

[SEAL.] CHARLES B. WILLEY,
Notary Public, Hamilton Co., O.

Sworn to by said Hosea Ball before me and by him subscribed in my presence this day of , A. D. 1872.

And afterwards, to wit, on the day and year aforesaid, there was issued out of the said clerk's office our certain writ of a subpœna, clothed in the words and figures following, to wit:

UNITED STATES OF AMERICA,
Southern District of Ohio, ss:

The President of the United States of America to the marshal of the southern district of Ohio, greeting:

You are hereby commanded to summon George K. Withington and Oliver M. Langton, of Cincinnati, and citizens of and resident in the State of Ohio, if they be found in your district, to be and appear in the circuit court of the United States for the southern district of Ohio
143 aforesaid, at Cincinnati, on the first Monday in November next, to answer a certain bill in chancery, filed and exhibited in said court against them by Hosea Ball, citizen of and resident in the State of New York. Hereof you are not to fail under the penalty of the law thence ensuing, and have you then and there this writ.

Witness the honorable Salmon P. Chase, Chief Justice of the United States, this 11th day of October, A. D. 1872, and in the 97th year of the Independence of the United States of America.

Attest:
[SEAL.] THOS. AMBROSE,
Clerk.

MEMORANDUM: The said defendants are required to enter their appearance in this suit in the clerk's office of said court on or before the first Monday of November, 1872; otherwise the said bill may be taken pro confesso.

THOMAS AMBROSE,
Clerk.

On which writ is the following endorsement, to wit: $50.00 deposited as security for costs.

And afterwards, to wit, on the nineteenth day of October, in the year last aforesaid, came the marshal to whom the said writ was in form aforesaid directed and returned the same into the clerk's office of the court aforesaid, with his proceedings endorsed thereon in the words and figures following, to wit:

I received this writ, at Cincinnati, at 8.30 a. m, on the 12th day of October, 1872, and made service of the same by copy as follows: Personally on the within-named George K. Withington at two o'clock p. m., on the 12th day of October, 1872; not being able to find the within-named O. M. Langdon, he being absent from the district and State aforesaid, I left a copy of within writ at his usual place of business in
144 the hands of George K. Withington, his partner, on the 19th day of October, 1872, at 10 o'clock a. m.

W. R. THRALL,
U. S. Marshal, S. D. O.,
By J. P. PHARES,
Deputy.

And afterwards, to wit, on the thirtieth day of November, in the year last aforesaid, came the said George K. Withington and Oliver M. Langdon, the defendants herein, by Wood and Boyd, and filed in the clerk's office of the court aforesaid their joint and several answer to the bill of complaint herein, clothed in the words and figures following, to wit:

Circuit court of the United States for the southern district of Ohio. In equity.

HOSEA BALL
vs.
GEORGE K. WITHINGTON AND OLIVER M. LANGDON. } No. 1671.

The joint and several answer of George K. Withington and Oliver M. Langdon, defendants to the bill of complaint of Hosea Ball, complainant.

The defendants, now and at all times hereafter saving to themselves all and all manner of benefit or advantage of exception or otherwise that can or may be had or taken to the many errors, insufficiences, uncertainties, and imperfections in the said bill contained, for answer thereto, or to so much thereof as these defendants are advised it is material or necessary for them to make answer to, severally answering, say as follows:

They admit that the complainant obtained the letters patent for improvement in ovens, dated September 23rd, 1856, described in said bill of complaint, but whether the same were issued in due form of law they are not advised save by said bill, but defendants deny that the complainant was the original and first inventor of the said improve-
145 ments so patented or of any substantial or material part thereof.

Defendants admit that the complainant surrendered said letters patent to the Commissioner of Patents, and that he did on the 12th day of October, 1869, receive a reissue thereof numbered 3666, but whether the same were issued in due form of law defendants are not informed save by said bill, and therefore leave complainant to such proof as he may be advised is necessary.

Defendants admit that complainant surrendered said reissued letters patent to the Commissioner of Patents, and that he did, on the 14th day of June, 1870, receive therefore a second reissue numbered 4026, but whether the same were issued in due form of law defendants are not informed save by said bill, and therefore leave complainant to his proof.

Defendants also admit that the complainant made application for an

extension of the term of said last-mentioned reissued letters patent for several years from and after the 23rd day of September, 1870, and that the said extension was granted, but whether said application was made on or about June 15th, 1870, or whether a full examination was had by said Commissioner and what effect the certificate of said Commissioner was declared to have, defendants are not informed save by said bill, and therefore leave complainant to such proof as he may deem necessary.

Defendants, on information and belief, deny that said original letters patent or said reissued letters patent No. 3666 were surrendered, as aforesaid, for good and lawful cause, or that complainant in that respect complied in all things with the acts of Congress in such case made and provided.

146 Defendants further deny that either of said reissued letters patent, and more particularly No. 4,026, are for the same invention as that described, claimed, or shown in said original letters patent dated September 23rd, 1856.

And defendants, upon information and belief, allege that said surrenders of said original letters patent and the reissue thereof, No. 3666, one or both, was or were made for the express purpose of introducing new matter not shown, suggested, or indicated in the specification, drawing, or model filed with the original application, and also for the purpose of obtaining a claim broader than the invention and broad enough to cover the invention of subsequent inventors and patentees.

Defendants, on information & belief, further deny that complainant has invested and expended large sums of money, or been to great trouble in and about said alleged invention or for the purpose of carrying on the business of making and vending ovens containing said improvements, and they deny, on information and belief, that the complainant has applied said alleged improvements to practical use, or that they have been useful, of benefit or advantage to the public, and they say on information and belief that the alleged improvements were impracticable and worthless.

Defendants also admit that the public or those interested have generally acknowledged and acquiesced in the rights of complainant to the alleged invention described and claimed in said original letters patent, but deny, on information and belief, that any person has acknowledged such rights to cover ovens such as are used by the defendants.

Defendants deny that complainant was the original and first inventor of the improvements described and claimed in said reissued let-
147 ters patent No. 4026, or of any substantial or material part thereof.

Defendants deny that they have in any way or at any time contrived to injure complainant or to deprive him of the benefits or advantages accruing or which might accrue from his said invention, and they further deny that they have made or used ovens made according to, employing, or containing the invention of complainant, or that they threaten to do so.

Defendants admit that they have used and are now using ovens for the baking of bread, &c., made according to and containing the invention secured to one James Hall by letters patent of the United States, No. 108258, and dated October 11th, 1870, by the consent and allowance of said Hall, for which they paid said Hall a valuable consideration, but they deny that the same are an infringement of complainant's said letters patent.

And these defendants having fully answered all of said bill which they are advised it is material or necessary for them to make answer unto, set up by way of defence thereto the following matter, that is to

say, that prior to the complainant's alleged invention the same was substantially described in whole or in part in printed publications and letters patent hereinafter stated:

French letters patent granted to Mathew Carrat for ovens for bake-houses, dated March 31st, 1840.

French letters patent granted to M. Covelet for bake-ovens, dated June 13th, 1846.

French letters patent granted to A. F. Sellique for bake-oven, dated September 24th, 1829.

French letters patent granted to Jean Laure for bakers' oven, dated October 17th, 1825.

English letters patent granted to Isaac Coffin for bake-oven, sealed May 5th, 1810, and numbered 3337.

English letters patent granted to James Smith for bake-oven, dated March 9th, 1854, and sealed September 1st, 1854.

148 English letters patent granted to Messrs. Vicars for ovens, dated December 22nd, 1852, No. 1138.

And these defendants deny all and all manner of unlawful combination and confederacy wherewith they are by the said bill charged, and of all wrongful acts of whatever nature, without this, that there is any other matter, cause, or thing in said complainant's said bill of complaint contained material or necessary for these defendants to make answer unto and not herein and hereby well and sufficiently answered, confessed, traversed, and avoided or denied, is true to the knowledge or belief of these defendants, all of which matters and things these defendants are ready and willing to aver, maintain, and prove, as this honorable court shall direct; and they pray to be hence dismissed with their reasonable costs and charges in this behalf most wrongfully sustained.

G. K. WITHINGTON.
E. M. LANGDON.

WOOD and BOYD,
Sol's for Def'ts.

STATE OF OHIO,
Hamilton Co., ss:

On this 29th day of November, 1872, before me personally appeared George K. Withington, who was first sworn, and Oliver M. Langdon, who was affirmed, in the above-named defendants, who, one affirming and the other made oath that they had read or heard read the above answer subscribed by them and know the contents thereof, and that the same is true of their own knowledge except as to matters which are therein stated to be on their information and belief, and as to those matters they believe them to be true.

O. M. LANGDON.
G. K. WITHINGTON.

Sworn to before by G. K. Withington and affirmed by O. M. Langdon before me and subscribed in my presence this 29th day of November, A. D. 1872.

[SEAL.] H. E. RANDALL,
Notary Public within and for Hamilton County, O.

149 And afterwards, to wit, on the fifteenth day of February, in the year of our Lord one thousand eight hundred and seventy-three, came the said complainant by his solicitors, Fisher and Duncan, and filed in the clerk's office of the court aforesaid his certain replica-

tion to the answer of said defendant by leave of court first had and obtained, which said replication was clothed in the words and figures following, to wit:

Circuit court of the United States for the southern district of Ohio. In equity.

HOSEA BALL
vs.
GEORGE K. WITHINGTON AND OLIVER M. Langdon. } No. 1671.

The replication of the above-named complainants to the answer of the above-named defendants.

This repliant, saving and reserving to himself now and at all times hereafter all and all manner of benefit and advantage of exception which may be had or taken to the manifold insufficiencies of said answer, for replication thereunto says that he will aver, maintain, and prove his bill of complaint to be true, certain, and sufficient in law to be answered unto; and that the said answer of the said defendants is uncertain, untrue, and insufficient to be replied unto by this repliant, without this, that any other matter or thing whatsoever in the said answer contained, material or effectual in the law to be replied unto, and not herein and hereby well and sufficiently replied unto, confessed and avoided, traversed or denied, is true; all which matters and things this repliant does and will be ready to aver, maintain, and prove, as this honorable court shall direct, and humbly prays as in and by his said bill he has already prayed.

FISHER AND DUNCAM,
Solicitors for Complainant.

150 And afterwards, to wit, on the thirty-first day of October, in the year last aforesaid, the following decree was entered upon the journal of the said court, to wit:

Final decree.

United States circuit court for the southern district of Ohio. In equity.

HOSEA BALL
vs.
GEORGE K. WITHINGTON AND OLIVER M. Langdon. } No. 1671.

This suit having been brought to a final hearing upon the pleadings and proofs, and counsel for the parties respectively having been heard thereon and the same having been duly considered by the court, it is found that the equity of the case is with the defendants and that the said complainant is not entitled to the relief asked in the bill of complaint herein, and it is hereby ordered, adjudged, and decreed that the said bill of complaint do stand dismissed out of this court with costs to be paid by the complainant to the defendants, and that execution issue therefor.

And afterwards, to wit, on the 3rd day of November in the year last aforesaid, came the said complainant, Hosea Ball, by Fisher and Duncan, his solicitors, and filed in the clerk's office of the court aforesaid his certain petition for rehearing, which petition was clothed in the words and figures following, to wit:

United States circuit court, southern district of Ohio. In equity.

HOSEA BALL
vs.
GEORGE K. WITHINGTON AND O. M. LANGDON. } No. 1671.

To the honorable the judges of the circuit court of the United States for the southern district of Ohio:

The petition of Hosea Ball humbly showeth that your petitioner is much aggrieved by the decree or order made in the above cause
151 on the 31st day of October, 1873, whereby it was ordered that the bill in the above cause should be dismissed with costs, because, as is stated in the opinion of the court filed in the above case among other things, "the original patent did not warrant that part of the claim in the reissue which included the direct application of heat to the bread chamber," and "as the original patent provided no mode for the application of the products of combustion material in this process, the subsequent claim for it is void." That your petitioner submits that said findings are erroneous.

Wherefore your petitioner prays that your honors will grant a rehearing of this cause, and that on said hearing said decree or order may be set aside or ; and your petitioner further prays your honors that during the pendency of this petition for rehearing, and also after it shall have been granted, the order dismissing said cause and awarding execution for costs be suspended until the further order of the court shall be made in reference thereto.

FISHER AND DUNCAN,
Sol's for Complainants.

As counsel for the petitioners we respectfully state to the court that in our own opinion this application is not for delay merely, but is founded on good grounds and ought to be granted and the case be reheard.

FISHER AND DUNCAN,
Sol's for Petitioner.

And afterwards, to wit, on the 20th day of December, in the year last aforesaid, an entry was made upon the journal of said court in said cause, clothed in the words and figures following, to wit:

United States circuit court, southern district of Ohio. In equity.

152 HOSEA BALL
vs.
GEORGE K. WITHINGTON & OLIVER M. Langdon. } No. 1671.

On motion of complainants it is ordered that the decree heretofore entered in this case be and the same is set aside and the case is set down for rehearing. And afterwards, to wit, this cause was continued from term to term until the 8th day of December, in the year of our Lord one thousand eight hundred and seventy-four, when the following decree

was entered upon the journal of said court, to wit: This cause coming on to be heard pursuant to an order heretofore made setting aside the final decree entered herein at the October term, 1873, and having been argued by counsel and duly considered by the court, it is found that the equity of the case is with the defendants, and that said complainant is not entitled to the relief asked in the bill of complaint herein; and it is hereby ordered, adjudged, and decreed that the said bill of complaint do stand dismissed out of this court with costs to be paid by the complainant to the defendant, taxed at $, and that execution issue therefor.

United States circuit court, southern district of Ohio, ss:

I, Thomas Ambrose, clerk of the circuit court of the United States for the southern district of Ohio, hereby certify the foregoing to be a true and correct transcript of the record in the case of Hosea Ball against George K. Withington and Oliver M. Langdon, No. 1671, as the same is kept in this office.

In testimony whereof I have hereunto set my hand and affixed
153 the seal of said court at Cincinnati this 31st day of July, A. D. 1876, and of the Independence of the United States of America the 101st.

Attest:

[SEAL.]

THOMAS AMBROSE,
Clerk U. S. Cir. C't S. D. O.

Also HENRY MILLWARD, a witness produced on behalf of respondents, being duly sworn, in answer to interrogatories propounded to him by counsel says as follows:

Q. 1. State your name, age, residence, and occupation.

A. Henry Millward; 32 years of age; reside in Cincinnati, Ohio; am engaged professionally as solicitor of patents and menchanical engineer.

Q. 2. State what facilities, if any, you have had for becoming familiar with mechanical devices generally, including bake ovens.

A. During the past 18 years I have been engaged in mechanical pursuits, the first seven years of which time my time was divided between the workshops in the capacity of practical machinist, and in the drawing office in the capacity of draughtsman, since which time I have held positions as chief engineer in the construction and erection of the various kinds of machinery, and was for several years sup't in one of the largest manufacturing establishments in this city. I am now daily engaged in the preparation of applications for letters patent for a variety of mechanical devices. I have been called upon at different times to make drawings of bake ovens of the old and new styles of construction, and have on several occasions done a good day's baking in some of the first-mentioned ovens.

Q. 3. State whether you have examined and understand the
154 following exhibits: Complainant's Exhibit "Ball Reissue," Complainant's Exhibit "McKenzie Reissue"; Respondent's Exhibits "Ball Original Patent," "Ball Model," Dozier Oven," "Gennison Patent," "Jennison Reissue," "Smith Patent," "Smith Model," "Vicar's Patent," "Vicar's Model," "Sellique Patent," "Selliqne Model," "Cavelet Patent," "Covelet Model," and "Corrat Patent."

A. I have examined and studied carefully all of the above named patents and exhibits, and believe I understand the same.

Q. 4. Describe the construction and mode of operation of the Exhibit

Cavelet Oven, being letters patent granted to M. Cavelet, June 13th, 1846.

A. The exterior walls of the oven are very nearly square at the base, and are made of brick, the top of the oven being arched for the purpose of allowing the reel to revolve in close proximity thereto. In the center of said oven is fitted a reel with four gravitating bread pans, depending from arms fitted upon a shaft, and arranged to revolve at the pleasure of the operator; at the bottom of the oven is a cast-iron furnace, from which a series of involuting flues wind around two sides of the oven and discharge the gases which pass through the fireplace into a semi-circular receptacle at the crown of the arch, and from thence to the main flue. A damper is arranged at the bottom of the main flue to regulate the draft and heat from the furnace; the one side of the furnace on a line little below the center of the shaft is the main opening to the furnace through which the material to be baked is placed upon the revolving reel, and from which it is again withdrawn and baked; the oven is heated by radiation from the fire box and from the involuting flues, the heat from the fire box being more intense
155 than that from the flues. The reel in revolving passes over the fire box and gets all the benefit of the extra heat radiated therefrom, and it will be necessary in a proper operation of the oven to revolve the reel so as to bring the material baking through the different degrees of heat.

Q. 5. State whether Exhibit Cavelet Model correctly represents the oven shown and described in the last-named patent.

A. It does with the exception of the end being left open in order to illustrate the workings of the oven, but it is a correct representation of the interior of the oven.

Q. 6. Describe the construction and operation of Exhibit Corrat Patent, being letters patent granted to M. Corrat Mar. 31st, 1840.

A. This is a cylindrical oven; double walls; in the interior chamber revolves a reel with gravitating bread pans, similar to the one I have described; the gasses arriving from the fire chamber passes through the space left by the double wall and surround the inner chamber on its exterior surface, a portion of the gases being free to enter the interior baking chamber through a series of perforations in the hollow shaft upon which the reel revolves. The heat in the bottom of the bread chamber will be greater than at any other point of the oven, and it will be necessary to revolve the reel so as to bring the bread in contact with the varying heat at different points in the oven, so as to get the best results possible from such an oven. While it is a fact that the gases are free to enter through the baking chamber through this hollow perforated shaft, the gases emission from the material being baked wou'd be free to pass out at the opposite end from which the gases from the furnace enter.

156 Q. 7. Describe the construction and operation of Exhibit Smith Patent, being letters patent granted to James Smith Mar. 9th, 1854.

A. This is a brick oven with an endless band running from one end of the oven to the other, and the whole width of the oven; the endless band being formed by joining the edges of the plates in such a manner as to allow it to conform to the shape of two shafts, one at each end of the oven over which it passes, and by which it receives motion; the oven is provided with two fire chambers which communicates directly with the material to be baked, and is so constructed that the gases arising from the furnace can be made to pass underneath the travelling

band between it or above it, or all at the same time, at the pleasure of the operator; it is also provided with an adjustable lap, which enables the operator to pass the gases arising from the heating chamber directly to the top of the material baking or to cut off the stop current of heat and pass it directly through the escape flue, when the material is placed upon the end of the band and the band put in motion by rotating the shafts over which it passes, the material is carried back and baked during its travel from front to rear; at the rear end of the oven the material is discharged automatically on to a vertical elevator upon which it is elevated to the floor above, and there discharged.

Q. 8. State what parts of the oven shown and described in the last-named patent, if any, the Exhibit Smith Model illustrates.

A. The model is a substantial representation of the patent above described. The parts numbered 1 & 2 are intended to represent the two furnaces, and the aperatures marked 3 represent the openings through which the gases pass underneath the endless band; the open-
ings marked 4 represent the opening for admission of gases be-
157 tween the band; the openings marked 5 represent the entrance for heated gases above the band, and the opening marked 6 the entrance for heated gases above the adjustable top; the shaft marked 8 represents the axis on which the band revolves. The model also represents the elevator on to which the baked material is discharged and carried to its desired destination; parts of the side of the oven, also the top and a portion of the front, have been removed in order to more clearly bring to view the interior construction.

Q. 9. Describe the construction and operation of the device shown in Exhibit "Vicars patent," being letters patent granted T. & T. Vicars Dec. 22d, 1852.

A. It is a square brick oven consisting of three baking chambers running parallel with each other and one above the other, the fire chamber situated in the right front corner, each of the chambers is divided by a vertical partition with a communicating aperature in the rear, each chamber is provided with a double tramway for the conveyance of the material to be baked into said chamber. There is also a regulating damper to each chamber by which the direction of the heated gases arising from the furnace can be changed so as to enter either of the chambers separately, or all at once; there is also a peculiar device for placing the material to be baked upon the trays which slide upon the above-named tramways without loss of time. The material to be baked is placed upon the tramway or tramways and run into the oven, the heating gases arising from the furnace passes through the lower chamber to the rear, from thence returns to the front left corner, passing over the material which is being baked; it then ascends to the upper chamber next above
and from thence to the rear of said chamber, where it returns
158 again to the front, and from thence to the top chamber where it travels to the rear, and returns again to the front and into the main flue or chimney; each of the sliding trays can be removed and returned while the oven is in operation.

Q. 10. State what parts of the oven shown and described in the last named patent, if any, the Exhibit Vicars model illustrates.

A. The model illustrates an oven substantially the same as shown and described, except the tramways are only shown in the upper chamber; the dampers are not shown, the top is removed, also the front, so as to show the interior of the oven. The device for loading the trays is not illustrated in the model.

Q. 11. Describe the construction and operation of the device shown

in Exhibit "Sellique patent," being letters patent granted Alexander F. Sellique Sept. 24th, 1829.

A. This oven is provided with a baking chamber, provided with tramways similar to those described in the last mentioned patent; there are two fire places from which the heated gases communicate directly with the said chamber and passing to the rear returns along the top in a covered flue, and into the chimney; the tramways are provided with sliding trays for the introduction to the oven of the material to be baked; the tramway projects pass the front of the oven for the support of the sliding trays when they are drawn from the oven; in front of the oven between the two fire chambers is a receptacle for the fuel, which runs back parallel with the tramways a distance of about two-thirds the length of the oven. The material to be baked being run in upon the tramways aboved referred to, the entrance to the oven is closed and the heated gases from the fire chamber ascends through flues directly
159 into the baking chamber; passing over the material that is being baked on its way to the covered return flue, and from thence to the chimney, considerable heat will be radiated from the covered return flue, and thus there will be no unnecessary waste of fuel.

Q. 12. State what parts of the oven shown and described in the last named patent, if any, the Exhibit Sellique model illustrates.

A. The model is substantially a correct representation as shown in the drawings and described in the specification with the exception of the opening or flues from the fire place is represented in the model as one opening; whereas in the drawing it is represented as two situated directly one over each of the fire places; the door to the fire place and oven are not represented in the model, neither are the sliding trays, and one side of the oven is removed for the better view of the interior of the oven.

Q. 13. Describe the construction and operation of the device shown and described in said letters patent granted Hosea Ball Sep. 23d, 1856; and in connection therewith you will view the Patent Office model, marked "Ball model," and in your description include any feature shown in said model which is not shown in the drawing or described in the specification forming parts of said patent if any such there be.

A. In this oven there is a revolving reel with four gravitating bread trays depending therefrom substantially the same as those shown in the Covelet and Corret patents; the oven is constructed with double brick walls; in the interior chamber formed by these two walls revolves the reel above referred to; the fire chamber at the bottom of the oven is separated from any direct communication with the reel by an arch constructed between said fire place and the circle described by said gravitating bread trays. The heated gases ascending from the fireplace pass through apertures underneath the arch separating the fireplace from the reel, then it passes around the exterior surface of the interior chamber on three of its sides, and from thence through aperture or perforations in said chamber into the baking chamber in which the reel is located, and out through the flue situated at the top of the same,
160 and there is also an automatic device for the discharge of the material baked, consisting of a chute projecting into the baking chamber against which the gravitating trays are held until the reel in revolving causes them to assume the same angle as the chute, and there discharge its load on the outside of the oven. I do not see anything in the model that is not described or shown in the drawing.

Q. 14. Keeping in view the devices shown in the Covelet, Corret, Smith, Vicars, and Sellique patents, state, first, what new mechanical features you find in the Ball reissue; and, second, what invention, if

any, in your opinion, was involved in the production of the combination specified in the first claim of said reissue.

A. In the Covelet patent I find a revolving reel with gravitating bread pans suspended from the arms or in plates of the same substantially such as those shown in the Ball reissue, but in this oven the gas arising from the fire chamber passes through covered flues surrounding the interior of the baking chamber, and the heat is radiated from these and the fire chamber instead of passing directly into and around the chamber. I also find in the Corret patent a reel substantially such as that described in the Ball reissue; this patent is also provided with a double wall similar to those described in the Ball reissue, but the heat to the baking chamber is principally radiated from the interior wall which surrounds the reel, having but very little openings for the introduction of the heated gases into the chamber. I find in the Sellique and Vicars patents that the products of combustion passing into or through the chamber within which the bread holders move and are retained while the material is being baked; and in the Smith oven I find a travelling bread carrier, and the application of the heated gases direct to the same, and the products of combustion necessarily having to pass into or through the chamber within which the bread carriers move, and is so described and claimed. I also find in the Smith patent an automatic device for discharging the baked material, but this device is not

161 substantially the same as the one described and claimed by Ball. I therefore find that the double chamber with Ball's peculiar manner of introducing the heated gases to the interior baking chamber by a series of perforations upon three of its sides, and with a crown arch over the fireplace interrupting the direct application of heat to the bread chamber, to be new. I also find the automatic discharge chute such as shown in the Ball reissue to be new. As to the second part of the question I am clearly of the opinion that no inventive power was necessary to be used to arrange the reel as shown in the old French oven so that the products of combustion from the fire will pass into or through the chamber in which said reel or bread carrier moves, it being the mere union of the French reel with the Smith, Sellique, or Vicars method of applying heat thereto. The reel operating precisely the same as the French reel, and the effect of the heat being precisely the same as either the Smith, Sellique, or Vicar, the operation of neither being enhanced, the result of union is a mere aggregation of a separate action. I am, therefore, clearly of the opinion that no invention is involved in the production of a combination specified in the first claim of said reissue.

Q. 14. How does the oven shown and described in the exhibit "Jemison Patent" compare in its principle of construction and mode of operation with the one shown and described in the McKenzie reissue, as specified in the first claim thereof?

A. In order that my answer may be clearly understood, I will describe the construction of both ovens. I find the Jemison patent describes an oven square at its base and elongated in a vertical direction, in

162 which travels a bread-carrier, substantially the same, although a little different in configuration to the one described in the old French patent, with the products of combustion from the fire-chamber unobstructed in its passage up to and around said reel, as is fully described in the first claim of his patent of the date and number before given; whereas in the McKenzie oven I find a reel precisely the same as the one described in the old French patent, except in the number of the gravitating pans depending from the said reel, with the products from the fire-chamber ascending through flues or apertures leading from

the said fire-chamber to the reel, substantially the same as the mode described in the Smith patent, viz, a fire-place, with an arch top, provided with apertures for the entrance of the gases emission into the baking chamber. I am therefore clearly of the opinion that if the arch over the fire-place, which is shown in the McKenzie drawing, was removed, they would be substantially the same in all its features as the one shown and described in the Jemison patent; but if the claim be intended to cover an oven with the top of the fire-place covered with a brick arch and perforated for the introduction of the gases to the baking chamber, there is a substantial difference in the two ovens. I say if it is intended to cover the oven with the arch-top fire-place, for the reason that the drawing and specification describes such an oven, whereas the claim describes one where the baking chamber is arranged above the fire place, and in direct communication therewith.

Q. 15. Keeping in view the Covelet, Corret, Vicars, Sellique, Smith, Ball, and Jennison patents, state what new mechanical features you find in the MacKenzie reissue; and, second, what invention, if
163 any, in your opinion, was involved in the production of the combination specified in the first claim of said MacKenzie reissue.

A. In view of the fact that when I find a reel substantially the same as the one referred to in the claim of the MacKenzie reissue in the Corrot and Covelet ovens, and the direct application of heat to similar travelling bread-carriers in the Smith, Jennison, Sellique, I fail to find any new mechanical features in the MacKenzie reissue. In answer to the second part of the question, I am clearly of the opinion that no inventive power was necessary to arrange the reel, as shown in the old French oven, so that the products of combustion from the furnace will pass into or through the chamber in which such a bread-carrier moves, it being a mere union of the above-described reel with either the Sellique, Vicars, or Smith method in applying heat thereto, the reel operating the same as the first-mentioned patent, and the operation of neither being improved, the result of the union being a mere aggregation of their separate action; and I am therefore of the opinion that no new inventive power was involved in the production of the combination specified in the first claim of the MacKenzie reissue.

Q. 16. State whether or not, in your opinion, the reel shown in the Ball reissue could be practically operated for the baking of bread in the bread-chamber shown in said reissue, if the crown over the furnace was removed, so that the heated gases would ascend directly from the furnace to the bread-chamber; and in any opinion you express you may refer to the original Ball patent and duplicate of the Patent Office model.

A. It would not be practical, for the reason that the heat would be more intense directly over the fire-chamber, and would be so in-
164 tense at that point as to make it necessary to revolve the reel during the operation of baking, or the bread on the pans which were in close proximity to the fire-place would be burned, while the bread on the tray furthest removed from the fire-place would not get the benefit of the heat necessary to a proper baking. Therefore, in my opinion, it is clear that the reel would have to be revolved, and in revolving, the gravitating pans would successively come in contact with the discharging chute, and dump its load of bread before it could be properly baked. It is clear from the language of the specification that the intention of the inventor was to keep the reel at rest during the baking process, for he says: "When the baking is completed the reel is revolved, causing the edge of each platform to come in contact with the

guides G, and by the depression thus produced, causing the platform to assume the angle of the chute and discharge its load thereon, whence it passes to a receiver outside the oven."

Q. 17. In your opinion would a mechanic of ordinary skill, having a knowledge that the heated gases had been introduced directly into the chamber where the baking was done, as in the Sellique, Smith, and Vicars patent, readily without invention so change the Covelet oven that the heated gases would distribute directly into the bread-chamber thereof? and give your reasons.

A. I am clearly of the opinion that out of twelve ordinary mechanics, having any knowledge of applying heat to a bake-oven, and who had learned that heat could be applied directly to a bread-chamber without any bad effects being produced from the gases arising from the coke or hard coal, that at least nine out of the twelve would naturally apply it that way, from the fact that economy of fuel would be obtained
165 thereby; and if he were called upon to repair an oven constructed the same as the Covelet oven, and having knowledge that coke or hard coal could be used, and the benefit of all the heated gases be brought to play upon the material being baked, without any obnoxious results, would naturally perforate the flues in said oven, so as to get the full benefit of the heat, as near as practicable, in an oven of this construction. I am therefore clearly of the opinion, that a man having the knowledge as suggested in the question, being called upon to introduce the heated gases into the baking-chamber of a Covelet oven, could do so without invention.

Cross-examination:

X Q. 1. You have stated it to be your opinion that the construction of the Ball oven, so far as the devices referred to in the first claim of the reissue are concerned, and the construction of the MacKenzie oven, so far as the devices referred to in the first claim of the MacKenzie reissue are concerned, did not, in view of the patents in existence, involve invention. Please state what, in your opinion, constitutes invention.

A. Speaking in a general way, anything new and useful.

X Q. 19. You will say, then, that any device or any machine which was new was an invention, do you?

A. Yes; if it is useful, too, at the same time.

X Q. 20. You think that nothing can be an invention that is not useful, do you?

A. I do not see what the inventor would have in view when *in* occupying his time to produce an article that would not be useful.

X Q. 21. As a matter of fact, have you ever known of any devices that were new and not useful?

A. Yes; I have.

166 X Q. 22. And you would say that they would not involve invention because they were not useful, would you?

A. I would say that such an application of devices suggested in the question going before the Patent Office would be rejected on a ground that no useful result had been obtained.

X Q. 23. Please answer my question.

A. I would as I understand the meaning of the word invention.

X Q. 25. Then you would understand that any device entirely new and exceeding *and* ingenious in its construction would not be an invention if it did not serve some useful purpose, do you?

A. I don't know that it is necessary for it to serve some useful purpose; but is certainly should be capable of doing so.

X Q. 26. What do you mean by useful purpose?

A. I mean that when a man applies for a patent and asks the authorities to grant him an exclusive monopoly of a supposed invention he should not put forth the device which is simply ingenious and ask parties employed to pass upon the same, to devote their time in passing upon the merits of a case where no real merit exists.

X Q. 27. The last answer is intended as a definition of the word useful, as used by you, is it?

A. No; I intend the last answer as an illustration.

X Q. 28. Have you been asked any question as to practices in the Patent Office, or any question that calls for your ideas, for what that practice should be? If so, refer to the language in which you have been so asked.

A. Not directly.

X Q. 29. Have you indirectly; if so, recite the language in which you have been so asked?

167 A. In cross-question 2 you ask me if I would say, that because certain devices were not useful would I say could they not involve invention, which called for the illustration above given.

X Q. 30. Then you understand the question as to whether a device could be an invention without being useful to be indirectly a question as to what the rules of practice are and ought to be in the Patent Office, do you?

A. I simply gave that as an illustration of what a device that was only ingenious without being useful would be.

X Q. 31. Please answer my last question directly by yes or no.

A. I do not.

X Q. 32. Why, then, when asked to refer to the language by which, if at all, you have been asked about the rules of practice in the Patent Office, did you quote the language referred to in the 30th question?

A. I thought the question referred to a patentable device.

X Q. 33. Do you not see the distinction between a question of invention and a question of patentability under the United States patent law?

A. I do.

X Q. 34. Where do you find any definition of the word useful which depends upon a construction of the United States patent law?

A. I don't find that anywhere, but the word invention may be used in connection with a discovery which would not be patentable.

X Q. 35. Would you not now say that there would be invention in the construction of any operative device that was novel even though the result it was designed to accomplish and the result it was capable of accomplishing was a mischievous one and in no sense useful?

A. In the broad sense of the word invention I do say so; in 168 reference to the patentability, I should say no.

X Q. 36. Witness is here requested to observe in his answer the distinction between questions of mechanics about which he is interrogated as an expert, and questions of law, which as expert he has nothing to do; is also reminded that counsel in his questions confines himself to such terms as apply to mechanics, without reference to the construction of law, because he understands one to be proper subjects of inquiry for the expert and the other for the court.

X Q. 37. Will you now, observing that my question refers to invention and not to patentability, state as concisely as possible what you mean by invention?

A. Invention used in this sense might apply to discovery or the act of finding out.

X Q. 38. Would you, then, say, using the word invention in its ordinary sense, that any device *that any device* that was novel in its construction was invention?

A. Yes; it could be possible for a man to invent some ingenious device for counterfeiting bonds or erasing and changing checks.

X Q. 39. And if such device was not patentable it would be because it was mischievous to the public and against good policy, rather than because it was deficient in invention, would it not?

A. It would; or, in other words, it would not be useful.

X Q. 40. By useful, as you have hitherto used it, you mean advantageous to the public rather than operative, do you not?

A. I do.

X Q. 41. Do you find previous to the original Ball patent any bake-oven that contains all the features recited in the first claim in the reissue sued upon?

169 A. I do not.

X Q. 42. Do you find previous to the date of the original Mackenzie patent any bake-oven which contains all the features recited in the first claim of the McKenzie reissue sued upon?

A. I do not.

X Q. 43. In your opinion, is there no invention in constructing a device or machine when all the parts go to make up the machine and can be found individually in some other machine, though never united in a single machine before?

A. If the invention of a machine combining well-known parts referred to accomplished a new and useful result it would be patentable.

X Q. 44. Suppose the result accomplished was due simply to the several elements combined, accomplishing individually the same subject that they individually accomplished in other combinations, and that by combining the several results in a single machine an advantage was secured differing in degree but not in kind from that which was obtained in the old combinations in which the several elements were used, would the construction of such a machine involve invention in your opinion?

(Question objected to because it is impossible to answer such a hypothetical question.)

A. It would not.

X Q. 45. Are you acquainted with any patented device consisting of a combination of old elements which would not fall within the description of the last question? If so, name it.

A. I can't recall any at present.

X Q. 46. Would heat produce any different result when conveyed through an indirect channel from what it would when conveyed

170 through a direct channel the material to be baked?

A. I should think that the effect upon the material baking would be about the same in both cases if the degrees of heat were the same and the gases arising from the furnace were both brought in contact with the same bread.

X Q. 47. Suppose an oven so constructed that the bottom of the oven served as the fire box, with no partition between the fire and the material to be baked, to be sold, and an oven in which a reel was used to be old, but the two never to have been combined, would you by combining the two features secure any other result than the aggregation of the several advantages which was secured by these features when used in other combinations?

A. No.

X Q. 48. Would such a combination, in your opinion, constitute patentable invention?

A. I should say not.

X Q. 49. Have you often testified as an expert in patent cases?

A. I have not.

Re-examination:

Redi. Your attention is called to X Q. & A. 42, and you are requested to state what devices are specified in the first claim of the MacKenzie reissue which are not shown and described in the Jennison patent, if any.

(Objected to as a repetition.)

A. When giving my answer to X Q. 42, I overlooked the Jennison patent. I do not find any difference in the first claim of each of the patents above.

Red. 2. Please observe that my question does not ask for a comparison of the claims of these patents, but whether any of the devices specified in the first claim of the MacKenzie reissue are not shown and described in the Jennison patent, and if so, which?

171 (Objected to for same reason as before, also as leading.)

A. I do not find any substantial difference between the two ovens referred to.

Red. 3. In order that your answer to X Q. 42 may not be misunderstood, explain more fully what you mean.

(Same objection as before.)

A. I have already explained that I overlooked the matter of the Jennison patent, dated Feb'y 1st, 1859, which contains all the features in the first claim of the reissue sued upon, the only difference being the shape of the oven and the rotating reel located within the same.

HENRY MILLWARD.

Also JOHN BAILIE, a witness produced on behalf of respondents, being duly sworn, deposes as follows:

Q. 1. State your name, age, residence, and occupation.

A. John Bailie; between 72 & 73 years of age; a baker *and* trade; residence, Cincinnati.

Q. 2. Have you in use a reel oven known as the Hall oven, substantially like the model now shown you marked "Dozier oven"?

A. Yes, sir.

Q. 3. Are you personally acquainted with Duncan McKenzie, of Brooklyn, N. Y., named in letters patent Complainant's Exhibit MacKenzie Reissue now shown you?

A. Yes, sir; I am.

Q. 4. Please state if at any time after the erection of your oven it was inspected by said Mackenzie; and, if so, when, and what was said about the same by him, if anything?

(Question objected to as irrelevant and incompetent.)

A. After I got it erected he stopped in to see me and went in and seen the oven, and remarked that it wouldn't answer. He told me I might try it and if it didn't answer I could put in one of his

172 furnaces and it shouldn't cost me a cent. I think that that was all that passed. I thanked him for his kindness.

Q. 5. What did you understand was the part of the oven that would not answer, or what reason did he assign, if any, for saying that it would not answer?

(Same objection.)

A. My understanding was because it was an open furnace.

Cross-examination:

X Q. 7. Are you still using an oven built under the Hall patent?

A. Yes, sir; same one.

X Q. 8. In whose residence did the conversation you have recited occur?

A. I don't know if there was any one present, it being early in the morning.

JOHN BAILIE.

LEANDER HILTON, a witness produced on behalf of the respondent, being first duly sworn, deposeth and saith in answer to interrogatories propounded to him by Edward Boyd, esq., of counsel for the respondent, as follows:

Question 1. State your name, age, residence, and occupation.

Answer. Leander Hilton; age, 66; residence, Ware, county of Hampshire, commonwealth of Massachusetts; occupation, carpenter.

Q. 2. Are you acquainted with George C. Jennison, formerly of this place but now of Philadelphia?

Ans. Yes, sir.

173 Q. 3. State whether at any time you assisted in the construction of a bakery in this place for said Jennison.

A. Yes, sir.

Q. 4. State what part of the work you did, and when it was.

A. I put up the building, and it was all done between the 7th day of April and 23rd day of May, 1857.

Q. 5. State whether before this latter day there was an oven constructed in said building; and, if so, what particular work you did closely connected with it?

A. The oven was built, and the last work I had to do on the building was the 20th day of May, under my contract; that is, the brick work for the oven was all done and I put the joice around it.

Q. 6. State how you fix those dates.

A. I fix them by my day-book, kept at the time, which I hold in my hands.

Q. 7. State whether or not you subsequently saw the oven in operation.

A. Here is an item, I find, the 30th day of June, 1857, "repairing pie stand," which they broke in bringing it to the bakery, and while repairing that I saw them baking pies.

Cross-examination by R. H. PARKINSON:

Q. 1. In whose handwriting are the entries in the book from which you have read?

A. In my own.

Q. 2. Did you ever do any other work for the same parties?

A. Yes, sir; I did other work for them on the same building.

Q. 3. Were you in the habit of being in the same bakery for some years afterwards?

A. I was.

Q. 4. Did you frequently have jobs there?

174 A. I did.

Q. 5. Please quote upon the record the entry you have referred to under date of April 7th, 1857.

Jennison & Snow, Dr.

To 139 feet st. windows	2 22
To one day's work on seller window frames	2 00
To 40 feet st. sell frames	1 20
	5 42

Sell frames means cellar window frames; st. means stock—stock.

LEANDER HILTON.

Deposition of William A. Root.

WILLIAM A. ROOT:

Q. 1. State your name, age, residence, and occupation.

A. My name is William A. Root; age, 57; residence, Ware, Massachusetts; occupation, mason & builder.

Q. 2. Are you acquainted with George C. Jennison, formerly of this place, but now of Philadelphia?

A. I am.

Q. 3. State whether at any time you constructed for him a bake oven in this place; and, if so, when was it?

A. I did. It was in May, 1857.

Q. 4. Please give a general description of the oven.

A. The oven was built square, or upright, with a drum. The drum had an endless chain attached to it, so that the pans which held the crackers fastened on the chain. As this drum turned it carried the chain with the pans directly over the fire.

Q. 5. State how the heat was admitted to the oven; and if any change was made at any time, when and what it was.

A. It was admitted by building a fire-pit at the bottom. When I built it I covered it with tile. Afterwards they were taken off
175 or removed; not a great while. I couldn't state when; perhaps within a month.

Q. 6. Who did the wood work of the building in which the oven was placed?

A. Leander Hilton, of Ware.

Q. 7. What circumstance, if any, enables you to fix the date of the erection of the oven in May, 1857?

A. The circumstance is this: The last work that I done was topping out the chimney for the oven, before I went west. I was gone west about a month. When I arrived home I saw the news of George Lathrop's death—being drowned—a neighbor of mine. He died June 30th, 1857. I attended the funeral a day or two after I got home.

Q. 8. Did you subsequently do any work on the oven, repairing or otherwise; and, if so, what and when was the next work you did on it?

A. The next work I done was repairing chains. I couldn't fix the date; it was that season; in warm weather.

Q. 9. State whether before you did this last repairing of chains the tiles over the fire had been removed.

A. When I repaired the chain there was no tile over the fire.

Q. 10. If you have any knowledge of the practical use of the oven you have described to the baking of crackers or other material, state what it is.

A. Yes; I saw them using it.

Q. 11. Look at Respondent's Exhibit "Jennison Patent," and state how the oven which you constructed compares with the oven shown in

the drawing of said exhibit, assuming that the letter C is the fire-chamber.

176 A. I think it is a good drawing; good comparison. Compares well.

Cross-examination of Wm. A. Root, by R. H. PARKINSON:

Q. 1. Were the tiles ever replaced after they were taken off the fire-pit of this oven?

A. I think not.

Q. 2. How long did you know that oven to be used without further change?

A. I never heard of any particular change made on it. I should think it was used ten years; perhaps longer, perhaps shorter.

Q. 3. How constantly was it used?

A. I should say it was used mostly every day.

Q. 4. Was it so used that anybody who came to could see it, & see how it was constructed?

A. They could.

Q. 5. How large was it?

A. As near as I bear in mind now, I should say about five feet square, eighteen feet high. I should say about that.

Q. 6. About how much would it bake in a day?

A. I could not state.

WILLIAM A. ROOT.

Deposition of Jeremiah Byrus.

JEREMIAH BYRUS:

Q. 1. State your name, age, residence, and occupation.

A. My name is Jeremiah Byrus; age, 54; residence, Ware, Massachusetts; occupation, baker.

Q. 2. State whether you were ever in the employ of George C. Jennison, now of Philadelphia, formerly of this place; if so, in what capacity and when the employment commenced.

A. Yes, sir, as a baker. I commenced work for him in the month of August, 1856.

Q. 3. State whether Mr. Jennison had a mechanical oven built for him during your employ.

177 A. Yes, sir.

Q. 4. State when this oven was built.

A. In the spring of 1857.

Q. 5. Describe its general construction.

A. It was built of brick some 20 feet high. There was a furnace underneath, it was heated by, arched over the fire when it was built so that you could not see the fire inside of the oven. It was arranged with shelves in the inside, and then on the outside there was a chain run so as to carry the shelves in the oven. There was a wheel in the upper story around which the chain which carried the shelves passed; the chain was an endless one passing over a wheel at the top and bottom.

Q. 6. How were the shelves operated during the baking?

A. The shelves were moved by a crank on the first floor.

Q. 7. How long was the oven used with the arch over the fire, & what if any, change was afterwards made?

A. The first day we tried it we found it would not work with the arch over the fire. Those tile' were taken up the first week.

Q. 8. After the tile' were taken out how long was the oven used in that condition by Mr. Jennison, & who succeeded him in the bakery?

A. I should think Mr. Jennison run the concern some fifteen or eighteen months afterwards. I and two of his drivers succeeded him.

Q. 9. How long did you continue the use of it?

A. We used the oven I should think a year and half, and it might be two years.

Q. 10. During the whole time the oven was used by Jennison &
178 yourself was it used for baking for the public or for private use?

A. It was for private use. There had been some meal baked in it sometimes for outside parties.

Q. 11. By private use I mean for the use of your family, or that of Mr. Jennison. Explain what you mean by private use in your last answer.

A. Mr. Jennison might have brought something in there to bake, & I might have brought some in from my house.

Q. 12. In question 10 by the expression "public use" I intended to inquire whether the oven was used for the baking of material to be consumed, sold to citizens of this place or others who should desire to obtain the same, or whether it was only used to bake for your own family or that of Mr. Jennison, and with this explanation you will please state for whom the bread or other material was baked in the oven.

A. It was baked for the company and sold to different parties, teams running to different towns and States, and the towns people brought in their meats, puddings, and bacons to be baked.

Q. 13. State whether after the arch was removed as you have described anything intervened between the fire under the baking chamber and the revolving carrier upon which the material to be baked was placed during the time the oven was used by Mr. Jennison and yourself & co.

No, sir; not anything.

Cross examination by R. H. PARKINSON, esq.:

Q. 1. How much would this oven bake in a day?

A. Seven barrels of flour was the most we ever baked in it in one day.

Q. 2. How many hours do you reckon a day?
179 A. Twenty-four hours. We baked the seven barrels in nine hours.

Q. 3. Into what did you bake it?

A. Crackers.

Q. 4. What was the size of the oven?

A. Within the oven I should say was five feet square.

Q. 5. How much fuel did it require for a barrel of flour?

A. I didn't have anything to do with the fuel; another man ran the engine.

Q. 6. About how much fuel was consumed to each barrel of flour?

A. That question I could not exactly answer because we baked other things; about two bushels of hard coal daily. We did not bake as much as when Mr. Jennison used it.

Q. 7. About how much per day did you bake on an average after you commenced business?

A. We averaged about two barrels of flour per day.

Q. 8. What became of the oven?

A. The oven was taken down after we left it.

Q. 9. Why was it taken down?

A. We left and came down on the street and the men who owned it couldn't work it and took it down. I suppose that was the idea.

Q. 10. What kind of ovens did you use after you came down on the street?

A. We used the common oven such as Mr. Jennison used before he built this oven.

Q. 11. How long did you continue to use the common kind of ovens?

A. I am using it at the present time. I have been using it ever since.

Q. 12. By common kind you mean the old-fashioned brick ovens without any mechanical movement, do you?

Ans. Yes, sir.

180 Q. 13. Upon how large a scale have you been baking?

A. We have averaged two barrels of flour per day.

Q. 14. Was baking Mr. Jennison's principle business at the time he was using the chain oven?

A. He kept a grocery store at same time.

Q. 15. How many such ovens as his have you seen run?

A. I have never seen any except that one.

Re-examination by EDWARD BOYD, esq.:

Q. 1. What was the population of Ware between 1857 and 1860, as near as you can state?

A. About 3,600.

Recross-examination by R. H. PARKINSON, esq.:

Q. 1. How does the population now compare with what it was in 1860?

A. About five hundred more inhabitants now *now* than then.

Re-examination by EDWARD BOYD, esq.:

Q. 1. Who owned the property at the time the oven was taken down?

A. At the time we left Dr. Minn & Mr. Lawton owned the property.

Q. 2. Do you know how they got it?

A. I believe it was by mortgage.

Recross-examination by R. H. PARKINSON:

Mr. Jennison failed while running his oven, did he?

A. Yes, sir, I think he did.

JEREMIAH BYRUS.

(Respondent's counsel here offer in evidence a certified copy of the file wrapper & contents in the matter of the application of Duncan McKenzie for letters patent No. 28130, dated May 1st, 1860, and made it respondent's Exhibit McKenzie File Wrapper.

181 Also, a certified copy of the petition, statement, account, & testimony in the matter of the application for extension of reissued letters patent No. 3929, being reissue of said patent No. 28130, and ma'ked it Respondent's Exhibit, McKenzie's Extension Testimony.

Also, letters patent No. 132305, granted Duncan McKenzie October 15th, 1872, and ma'ked it Respondent's Exhibit, McKenzie Downward Draft.

To the introduction of each of which complainant's counsel objects on the ground of incompetency and irrelevancy.)

H. C. DAVIS,
Justice of the Pease.

Said exhibit of respondent, viz, "Respondent's Exhibit, McKenzie

File-wrapper and Contents," is in the words and figures following, to wit:

McKenzie file-wrapper.

(65.)

DEPARTMENT OF THE INTERIOR.

U. S. Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the files of this office of the file-wrapper and contents in matter of letters patent granted Duncan McKenzie, ass'or to Mary Ann Elizabeth McKenzie, dated May 1st, 1860, No. 28130, for imp't in ovens.

In testimony whereof I, W. H. Doolittle, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereto affixed this ninth day of November, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the hundred and first.

[SEAL.] W. H. DOOLITTLE,
Acting Commissioner.

X comp: Assigned to Mary Ann Elizabeth McKenzie.

Petition.

To the Commissioner of Patents:

182 The petition of Duncan McKenzie, of Brooklyn, in the county of Kings and State of New York, respectfully represents, that your petitioner has invented a new and useful improvement in the construction of baking-ovens, which he verily believes has not been known or used prior to the invention thereof by your petitioner. He therefore prays that letters patent of the United States may be granted to him therefor, vesting in him and his legal representatives the exclusive right to the same, upon the terms and conditions expressed in the act of Congress in that case made and provided, he having paid thirty dollars into the Treasury, and otherwise complied with the requirements of said act. And he hereby authorizes O. D. Munn, S. H. Wales, and A. E. Beach, of the firm of Munn & Co., or their accredited agents, to act as his attorneys in presenting the application and in making all such alterations and amendments as may be required.

DUNCAN McKENZIE.

Oath.

CITY, COUNTY, AND STATE OF NEW YORK, *ss:*

On this fifth day of March, 1866, before the subscriber, a commissioner of deeds and notary public in and for said county, personally appeared the within-named Duncan McKenzie, and made solemn oath that he verily believes himself to be the original and first inventor of the within described improvement in the construction of baking-ovens, and that he does not know or believe that the same was ever before known or used, and that he is a citizen of the United States.

PHILIP MILSPAUGH,
Notary Public.

To all whom it may concern:

Be it known that I, Duncan McKenzie, of Brooklyn, in the
183 county of Kings and State of New York, have invented a new and useful improvement in the construction of baking-ovens; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings forming a part of this specification, in which—

Figure 1 represents a transverse vertical section taken through the fireplaces, ash-box, and flues of my improved oven, showing the direction the heated currents take in leaving the fire-places.

Figure 2 is a vertical longitudinal middle section taken through the oven and brick work as indicated by the red line *x x*, of figure 1, in which the central hot-air flues is shown communicating with the main escape-pipe with its valves or dampers in the front and rear part of the flue passage. This figure further shows in dotted lines the outline of the grate and fire-bridge with the escape passages for hot air.

Similar letters of reference indicate corresponding parts in both figures.

Erased April 10, '60.

The object of this invention is to construct the oven in such a manner that the direct heat of the fire may be obtained within the baking apartment in a more simple and efficient manner; at the same time this heat will be more equitably diffused throughout the oven than with ovens of the present construction, and the draft and the conducting of the heat can be carried on by peculiarly arranged dampers in a more simple and perfect manner, using for fuel hard or anthracite coal.

For this purpose my invention consists in the general arrangement and construction of the fire place or places with their arches and bridges, or beds, and a system of escape
184 flues which lead off from one side of the fire apartment toward the side of the oven and conduct the heat directly from the fire and fire-arch and flame-bed into the oven, to the top of the same and down again at the front and back ends of the same through a central flue which leads to the main escape-pipe, as will be hereinafter set forth.

To enable those skilled in the art to fully understand my invention, I will proceed to describe its construction and operation.

This invention belongs to that class of bakers' ovens in which anthracite coal is used as fuel where very little if any smoke is the result. In the drawings, A represents the fireplace with grate-bars B, built up in brick work C. This fireplace with its grate-bars and ash-pit extends back a suitable distance, represented by the dotted lines, figure 2, where there is a bed, E, of brick work built up, forming with the arch a passage leading back to the rear of the oven, through which the fire from the furnace A plays freely. D D are a series of flues which lead off from the furnace and the space over fire-bed E, and communicate with the oven G, which is arranged above the masonry. These short flues are the only means of escape for the heat from the furnace, except what little will be absorbed and given out by radiation from the brick work above the arch into the oven, and they (the flues) are sufficiently numerous to conduct off the heat very rapidly from the furnace and diffuse it through the oven.

I have referred to only one fireplace or furnace with side flues, but by

referring to the drawings it will be seen that two are used, both communicating with the oven above by flues which are d'rected towards
185 the sides of the oven, as indicated by red arrows, figure 1. Between the two furnaces is a coal receptacle H, and above this receptacle, and extending from the front to the rear of the oven, is a horizontal flue, I, which communicates with a vertical flue, I, extending up in rear of oven, as shown by figure 2. This lower and horizontal flue I communicates with the oven through holes in the front and in the rear of this flue which are closed by valves K K, figure 2, which can be operated from the front of the oven by means of damper-rods C C.

(Insert A, filed April 10, '60.)

In the centre of the top of the oven is a valvular opening, L, which communicates with the main flue by a flue, I^2, as clearly represented by the drawings. In the oven, G, are arranged a suitable number of gravitating pans, N, which are hung from rods, N, which extend across from the two circular revolving plates R R, which are turned by a shaft, S, having its bearings in each side of the oven. The bread pans are placed on these pans or swinging shelves, N, and the whole number are rotated at one time by turning the shaft S; the bread is thus made to receive a uniform heat. The bread pans are placed in and removed from the oven through door P, Figure 2.

The masonry C may be covered with a suitable thickness of metal, C, as represented in the drawings.

It will now be readily understood from the above description that when the fires are built up in the furnaces and the damper in the top of the oven opened, a direct ascending draught will take place, and the smoke and gas will all escape through the flue I^2, but when the fires are well lighted this damper should be closed and the front damper, or the rear one in the lower central and horizontal flue I, or both damp-
186 ers, may be opened or partially opened, when a downward draught will take place and the heated air escaping from the flues D will rise to the top of the oven on the sides and then descend in the centre of the oven to the central flue-space or spaces, and escape up the main flue F. The heated air will thus be made to circulate and to rotate in the oven and diffuse its heat throughout the entire oven apartment in a uniform and rapid manner, and instead of using heat by radiation, as in ovens of the present construction, I obtain a direct heat from the furnace, and thus economise time and fuel; besides, with my arrangement of damper, I am enabled to regulate the draught in firing up and to control the heat of the oven in a perfect manner. Having thus described my invention and improvement in baking ovens, what I claim as new and desire to secure by letters patent, is—

Erase and insert B, filed April 10, '60.

The arrangement of flues D along the line of furnace leading from the furnace into the oven towards the sides of the same, in combination with the central flue space I, having dampers K K in its front and rear for conducting the heated air from the oven and for giving a circulation and rotation to the heat in the oven, as and for the purposes herein set forth.

DUNCAN McKENZIE.

Witnesses:

M. M. LIVINGSTON.

WILLIAM THOMPSON.

(Endorsed) Filed March 7, 1860. H. S. 2311. D. McKenzie. Oven. N. Y. Mar. 27, '60.

U. S. PATENT OFFICE, *March 27th*, 1860.

SIR: The substantial anticipation of the invention for which you apply for letters patent as an improvement in ovens is seen in the
187 patent of H. Ball, of Sep. 23rd, 1856; a patent must, therefore, be denied. The specification and their drawing are herewith enclosed.

DUNCAN MCKENZIE,
Care Munn & Co., New York, A. D. C.

(Endorsed:) McKenzie. Rejection. March 27, '60.

NEW YORK, *9th April*, 1860.

To the Hon. Commissioner of Patents:

SIR: Herewith we return the specification and drawing of D. McKenzie, imp'd baking oven, with amendment and new oath.

A reconsideration is respectfully asked.

If the claim or any part of the specification is deemed inadmissible, we shall be obliged by the suggestion of such a change as will probably meet the views of the office.

Your ob'd't ser'v'ts,

MUNN & CO., *Att'ys.*

(Endorsed:) McKenzie. Letter from agents. Filed April 10th, '60. E. J.

(A insert.)

The specification of D. McKenzie, improved baking oven, is hereby amended as follows:

1st. By erasing the recital of the nature of the invention, commencing with the 1st line from the bottom of page 1 and ending with the 6th line from the bottom of page 2.

2nd. By adding at the end of the 15th line of page 4 the following:

"It will be observed that the end of the flue I, where the products of combustion escape into flue I, is enlarged into a chamber and bent downward, somewhat in the form of an inverted cone. The point of communication with flue I is at the lower part of this chamber; by this enlargement and downward projection of flue I the draft of flue
188 I acts equally upon the contents of flue I, drawing off the same more evenly and freely than if the flue I were continued horizontally out and opened directly into flue I^1. If the flue I were extended horizontally, as stated, the draft through the damper opening at the back end of flue I would be greater than the corresponding opening at the opposite end. But by the enlargement and downward extension of the rear end of flue I, the draft through both damper openings, K, are rendered uniform, and the baking operation thus improved and the fuel saved."

3rd. By erasing the claim and substituting the following:

(B insert.)

The combination of the hot-air flues D, escapes K K, and flue I, with the lower part or floor of the oven C^1, as and for the purpose herein shown and described. I also claim the enlargement and downward extension of the rear end of flue I in combination with flue I^1, as and for the purpose herein shown. I also claim the arrangement in combination with

the oven G of the flues I^2, I^1, I, D, and the dampers K K & I, as and for the purpose herein shown and described.

D. McKENZIE,
By MUNN & CO.,
Attorneys.

NEW YORK, *9th April*, 1860.

(Endorsed:) D. McKenzie. Baking oven. A & B. Amendment. Filed April 10, '60. E. J.

Petition.

The Commissioner of Patents:

The petition of Duncan McKenzie, of Brooklyn, in the county of Kings and State of New York, respectfully represents that your petitioner has invented a new and useful improvement in the con-
189 struction of baking ovens, which he verily believes has not been known or used prior to the invention thereof by your petitioner. He therefore prays that letters patent of the United States may be granted to him therefor, vesting in him and his legal representatives the exclusive right to do the same upon the terms and conditions expressed in the act of Congress in that case made and provided, he having paid thirty dollars into the Treasury and otherwise complied with the requirements of said act. And he hereby authorizes O. D. Munn, S. H. Wales, and A. E. Beach, of the firm of Munn & Co., or their accredited agents, to act as his attorneys in presenting the application, and in making all such alterations and amendments as may be required, and to receive the letters patent when granted.

DUNCAN McKENZIE.

Oath.

COUNTY OF NEW YORK, STATE OF NEW YORK:

On this 5th day of April, 1860, before the subscriber, a commissioner of deeds in and for said county, personally appeared the within named Duncan McKenzie, and made solemn oath that he verily believes himself to be the original and first inventor of the within described improvement in the construction of baking ovens, and that he does not know or believe that the same was ever before known or used; and that he is a citizen of the United States.

CORNELIUS R. DISORWAY,
Com. of Deeds.

(Endorsed:) McKenzie. New oath, April, 10, '60. E. J. $13\frac{9}{27}$. Clarke.
No. 28130. Duncan McKenzie, ass'or to Mary Ann Elizabeth McKenzie, same place, of Brooklyn, county of State of New York.
190 (Oath renewed.) Ovens.
Rec'd March 7th, 1860.

Petition	"	"	"
Affidavit	"	"	"
Specification	"	"	"
2 Drawings	"	"	"
Model	"	12	"

1. Cert. dep., $30. March T., 1860.
Cash.
Examined April 12th, '60. R. D. Clarke.
2. Issue. Shugert, April 14th, 1860.

3. Patented May 1st, 1860.
Recorded vol. 113, page 319.
2. O. E., 381.
O. On Munn & Co.
Ovens. N. Y.
Cal.
Rejected specification.
Ex'd. E. A. M., & their draw'g. Encl'd Mar. 27, '60.
Reissued April 19th, 1870. Improvement in ovens.

G. K. WITHINGTON, a witness on behalf of the defendants, being first duly sworn, deposeth and saith, in answer to interrogatories propounded to him by E. E. Wood, esq., of counsel for the defendants, as follows:

Question 1. State your name, age, residence, and occupation.

Answer. G. K. Withington; thirty-nine years; residence, Boston, Mass.; occupation, baker.

2. Q. How long have you been engaged in said business?

Ans. From the age of twenty-one years.

Int. 3. Name briefly the different kinds of ovens you have used.

191 Ans. My first experience was with the old common brick oven; then the furnace oven, an improvement on the first; then the Hall reel ovens; also an oven called the Crumbie patent and one called the Jennings patent, the last being reel ovens.

4. What was the name of the company that used the McKenzie oven and who erected it?

A. G. K. Withington & Co., of Cincinnati. Duncan McKenzie erected the first oven; the second oven was on the same plan, McKenzie patent, but not erected under his personal supervision.

5. Look at a copy of McKenzie's reissued patent No. 6397, of Apr. 20th, 1875. State whether or not that represents the oven used by Whittington & Co., of Cincinnati, built by McKenzie.

A. I think it does; there may be some slight variations, but practically it is the same oven.

6. How long, about, did you use this oven?

A. Five or six years.

7. When and where was the Hall oven used?

A. At the same place by the same firm; succeeding the other, & being the same oven, really, altered over.

8. How altered over?

A. The furnaces were entirely removed, the whole bottom of the oven was taken out.

9. Who made this change?

A. Mr. Hall.

10. How did the operation of the Hall oven compare with that of the McKenzie oven in economy of fuel, ease of managing the oven, and in cost of repair of the two kinds of oven?

A. The Hall oven I found much more economical in point of fuel. I recollect taking special pains to compare the two ovens in that
192 particular, and have here a copy of the certificate I gave Mr. Hall, which is as follows:

"CINCINNATI, *April 23rd*, 1873.

"JAMES HALL, Esq.:

"DEAR SIR: Yours of the 19th inst. is at hand. We have never kept a separate account of our ovens, and can only give the consumption of both ovens. The average consumption of coke before you altered our

ovens was 1,300 bushels per month. Since then, and doing fully as much, and some of the time more business, and have used but 1,000 bushels. We calculate the saving is fully 300 bushels per month.

"Respectfully yours,

"G. K. WITHINGTON & CO."

As to ease of control, the Hall oven is preferable, as the fires are smaller. The point of cost of repairs is strongly favorable to the Hall oven on account of its simplicity of construction. During the whole time we used the Hall oven we were not obliged to make any repairs, while with the McKenzie oven we were obliged to make some repairs as often as once each year.

(Complainant's counsel objects to answer as incompetent.)

11. Why would the McKenzie oven need repairs, and what was their nature?

A. There was a large number of small flues leading from the furnace to the oven chamber. They would frequently become obstructed and need renewing.

12. What were those flues made of?

A. Of fire brick.

13. About how long would the brick last? Did they ever require renewing?

A. I renewed the furnaces with new brick at least three times
193 while we used the oven. Repairs were made at other times.

14. What is your opinion as to the quality of the material baked when baked in these reel ovens and when baked in other ovens, suppose the baking to be done in the same time; that is, do you or not obtain any advantage in quality of bread by having the burning gases come in contact with it as in the Hall and McKenzie ovens?

A. I claim that no oven bakes bread so well as the old-fashioned brick oven, so far as quality is concerned.

15. What ovens are you using now?

A. I am using what they call the "Raney oven," an open furnace reel oven, similar to the Hall oven.

16. What is the name of your company?

A. G. K. Withington & Co., doing business in Boston.

17. How many ovens are you using, and of what capacity?

A. Two. We can bake a hundred barrels of flour into bread in twenty-four hours.

18. How do they compare in capacity with the Cincinnati ovens?

A. One of the Cincinnati ovens was larger, the other the same in capacity.

19. About what was the price of coke in Cincinnati during the time you used those ovens?

A. From eight to twenty cents per bushel, from twelve to fourteen cents the average probably.

Cross-examination:

X 1. Was the letter of Mr. Hall, referred to in your direct examination, written by you with the understanding that he wished it for publication or advertising purposes?

A. It was.

194 X 2. Are you now interested in the use of ovens substantially the same in general construction as the Hall oven?

A. I am. I am using them.

X 3. Did you ever know ovens built like the Hall oven to require repair or renewal in any of their parts?

A. Slight repairs around the furnace doors are all I ever knew of.

X 4. Describe definitely the changes made in the ovens in Cincinnati to which you have referred in converting them into the Hall oven.

A. I should say that we removed the entire bottom of the oven, including both furnaces, and excavated some two feet deeper below them, at which point we put in the Hall furnace.

X 5. Did you make any change in the flues regulating the draft and carrying off the smoke?

A. None.

X 6. Did you make any change in the dampers or mode of regulating the draft?

A. We did not.

X 7. The only change made then was in deepening the oven and removing the brick-work between a portion of the oven and fire-pit?

A. The furnaces in the McKenzie oven ran the entire length of the oven. The change was in deepening the oven and removing all brick in the bottom of the oven.

X 8. Did you substitute other brick work in part?

A. We did.

X 9. How do crackers baked with the direct action of the heated gases from the furnaces upon them compare with those baked in a close oven?

195 A. I never used such an oven as the last named except the latter oven, which was a failure.

X 10. How do crackers baked by the direct action of the heated gases from the furnace compare in quality with those baked by heat radiated from the walls of the oven?

(Objected to by defendants' counsel.)

A. Have never used such an oven unless the ordinary brick oven is one. If such is meant, I consider the quality of cracker baked in such an oven better than in the first described in the question.

X 11. Could the old fashioned oven be used to-day in successful competition with the McKenzie and Hall ovens?

A. No, sir.

X 12. How does the quality of bread and crackers baked in the Hall oven compare with that baked in the McKenzie oven?

A. There is no practical difference.

X 13. How many pounds of bread or crackers can you bake in a Hall oven of the size of the smaller oven used by you at Cincinnati with a bushel of coke?

A. I never made experiments in that direction and cannot tell.

X 14. Can you give an approximate estimate for either bread or crackers, or any particular kind of either?

A. Approximately I should say that a bushel of coke would bake two hundred and fifty pounds of bread.

X 15. Could you be confident within a hundred pounds either way?

A. I think so.

X 16. Would a larger oven bake more or less to the bushel of coke?

A. I should say less if either way.

196 X 17. What is the difference in baking capacity between a ten pan oven and a twelve pan oven?

A. Supposing the shelves to be of the same length, the twelve pan oven would, I should say, bake a fifth more than the other, but I have never used a twelve pan oven of such length.

Re-ex.:

Do you consider the Raney oven equal to the Hall oven?
A. I do.

G. K. WITHINGTON.

(Here follow 2 diagrams marked pages 196, 197, 198, 199, & 200.)

201 *McKenzie original patent.*

(65.)

DEPARTMENT OF THE INTERIOR.

U. S. Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted Mary and Elizabeth McKenzie, dated May 1st, 1860, No. 28130, for imp't in ovens.

In testimony whereof I, W. H. Doolittle, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this fifteenth day of January, in the year of our Lord one thousand eight hundred and seventy-seven, and of the Independence of the United States the one hundred and first.

[SEAL.] W. H. DOOLITTLE,
Acting Commissioner.

No. 28130.

The United States of America to all to whom these letters patent shall come:

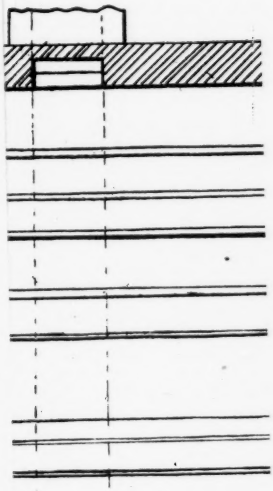
Whereas Duncan McKenzie, of Brooklyn, New York, has alleged that he has invented a new and useful improvement in ovens (he having assigned his right, title, and interest in said improvement to Mary Ann Elizabeth McKenzie, of said Brooklyn), which he states has not been known or used before his application; has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said improvement, and that the same hath not to the best of his knowledge and belief been previously known or used; has paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose:

These are therefore to grant, according to law, to the said
202 Mary Ann Elizabeth McKenzie, her heirs, administrators, or assigns, for the term of fourteen years from the first day of May, one thousand eight hundred and sixty, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said Duncan McKenzie in the schedule hereunto annexed, and is made part of these presents.

In testimony whereof I have caused these letters to be made patent and the seal of the Patent Office to be hereunto affixed.

Given under my hand at the city of Washington, the first day of May, in the year of our Lord one thousand eight hundred and sixty, and of the Independence of the United States of America the eighty-fourth.

[L. S.] JACOB THOMPSON,
Secretary of the Interior.



the form of an inverted cone. The point of communication with flue I is

Re-ex.:

Do you consider the Raney oven equal to the Hall oven?
A. I do.

G. K. WITHINGTON.

(Here follow 2 diagrams marked pages 196, 197, 198, 199, & 200.)

201 *McKenzie original patent.*

(65.)

DEPARTMENT OF THE INTERIOR.

U. S. Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted Mary and Elizabeth McKenzie, dated May 1st, 1860, No. 28130, for imp't in ovens.

In testimony whereof I, W. H. Doolittle, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this fifteenth day of January, in the year of our Lord one thousand eight hundred and seventy-seven, and of the Independence of the United States the one hundred and first.

[SEAL.] W. H. DOOLITTLE,
Acting Commissioner.

No. 28130.

The United States of America to all to whom these letters patent shall come:

Whereas Duncan McKenzie, of Brooklyn, New York, has alleged that he has invented a new and useful improvement in ovens (he having assigned his right, title, and interest in said improvement to Mary Ann Elizabeth McKenzie, of said Brooklyn), which he states has not been known or used before his application; has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said improvement, and that the same hath not to the best of his knowledge and belief been previously known or used; has paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose:

These are therefore to grant, according to law, to the said
202 Mary Ann Elizabeth McKenzie, her heirs, administrators, or assigns, for the term of fourteen years from the first day of May, one thousand eight hundred and sixty, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said Duncan McKenzie in the schedule hereunto annexed, and is made part of these presents.

In testimony whereof I have caused these letters to be made patent and the seal of the Patent Office to be hereunto affixed.

Given under my hand at the city of Washington, the first day of May, in the year of our Lord one thousand eight hundred and sixty, and of the Independence of the United States of America the eighty-fourth.

[L. S.] JACOB THOMPSON,
Secretary of the Interior.

at the lower part of this chamber. By this enlargement and downward projection of flue I the draft of flue I^1 acts equally upon the contents of flue I, drawing off the same more evenly and freely than if the flue I were continued horizontally out and opened directly into flue I^1. If the flue I were extended horizontally, as stated, the draft through the damper opening at the back end of flue I would be greater than the corresponding opening at the opposite end. But by the enlargement and downward extension of the rear end of flue I the draft through both damper openings K are rendered uniform and the baking operation thus improved and the fuel saved. In the centre of the top of the opening is a valvular opening, L, which communicates with the main flue I^1 by flue I^2, as clearly represented by the drawings.

In the oven G are arranged a suitable number of gravitating
205 pans, N, which are hung from rods N, which extend across from two circular revolving plates R R, which are turned by a shaft S, having its bearings in each side of the oven. The bread pans are placed on these pans or swinging shelves U, and the whole number are rotating at one time by turning the shaft *s*; the bread is thus made to receive a uniform heat. The bread pans are placed in and removed from the oven through door P, figure 2. The masonry C may be covered with a suitable thickness of metal C^1, as represented in the drawings. It will be readily understood from the above description that when the fires are built up in the furnaces and the damper in the top of the oven opened a direct ascending draught will take place and the smoke and gas will all escape through the flue I^2, but when the fires are well lighted this damper should be closed and the front damper or the rear one in the lower central and horizontal flue I, or both dampers, may be opened or partially opened, when a downward draught will take place, and the heated air escaping from the flues D will rise to the top of the oven on the sides and then descend in the center of the oven to the central flue space or spaces, and escape up the main flue F. The heated air will thus be made to circulate and to rotate in the oven and diffuse its heat throughout the entire oven apartment in a uniform and rapid manner, and instead of using heat by radiation as in ovens of the present construction, I obtained a direct heat from the furnace and thus economize time and fuel; besides, with my arrangement of dampers, I am enabled to regulate the draught in firing up, and to control the heat of the oven in a perfect manner. Having thus described my invention and improvement in baking-ovens, what I claim as new, and desire to secure by letters patent is, the combination of the hot-air
206 flues D, escapes K K, and flue I, with the lower part or floor of the oven C^1, as and for the purpose herein shown and described. I also claim the enlargement and downward extension of the rear end of flue I, in combination with flue I^1, as and for the purpose herein shown.

I also claim the arrangement in combination with the oven G of the flues I^2, I^1, I, D, and the dampers K K, and L, as and for the purpose herein shown and described.

DUNCAN MACKENZIE.

Witnesses:
M. M. LIVINGSTON,
WILLIAM THOMPSON.
Ex. A. T.

(Here follows diagram marked pages 207 & 208.)

209 *Complainant's Exhibit, McKenzie Reissue.*

The U. S. Patent office, to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the reissue letters patent granted Duncan McKenzie, dated April 20th, 1875, No. 6397, for imp't in bakers' ovens.

In testimony whereof I, R. H. Duell, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this fourth day of April, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundredth.

[SEAL.]

R. H. DUELL,
Commissioner.

(No. 6397. Reissue.

The United States of America to all whom these presents shall come:

Whereas Duncan McKenzie, of Brooklyn, New York, has presented to the Commissioner of Patents a petition praying for the reissue of letters patent for an alleged new and useful improvement in baker's ovens (for which letters patent were issued to him dated May 1, 1860, the same surrendered and new letters to him dated April 19th, 1870, and extended seven years from May 1st, 1874, which last letters having been surrendered, the same have been cancelled and new letters ordered to issue to him on an amended specification), a description of which invention is contained in the specification of which a copy is hereunto annexed and made a part hereof and has complied with the various requirements of law in such cases made and provided; and whereas, upon due examination made, the said claimant is adjudged to be justly entitled to a patent under the law:

210 Now, therefore, these letters patent are to grant unto the said Duncan McKenzie, his heirs or assigns, for the term of twenty-one years from the first day of May, one thousand eight hundred and sixty, the exclusive right to make, use, and vend the said invention throughout the United States and the Territories thereof.

In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the city of Washington, this twentieth day of April, in the year of our Lord one thousand eight hundred and seventy-five, and of the Independence of the United States of America the ninety-ninth.

[SEAL.]

B. R. COWEN,
Acting Secretary of the Interior.

Countersigned:

J. M. THACHER,
Commissioner of Patents.

(Here follows diagram marked pages 211 & 212.)

213 THE UNITED STATES PATENT OFFICE.

Duncan McK., of Brooklyn, New York. Improvement in baker's ovens.

Specification forming part of letters patent No. 28130, dated May 1, 1860; reissue No. 3929, dated April 19, 1870, extended seven years; reissue 6397, dated April 20th, 1875; application filed April 5th, 1875.

To all whom it may concern:

Be it known that I, Duncan McKenzie, of Brooklyn, in the county of

Kings, and State of New York, am the first and original inventor of certain new and useful improvements in baker's oven; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing which forms a part of this specification, and in which figure 1 represents a transverse vertical section of an oven embodying my said invention, the section being taken on the plain of the line x x, fig. 2; and fig. 2 is a vertical longitudinal section taken through the oven in the plane indicated by the line x x in fig. 1. This invention consists, first, in the combination in an oven for baking bread and other substances of the following elements: A furnace or fire-place (one or more), a baking chamber arranged above such furnace or fire-place, and in direct communication therewith, and a rotating reel located within said baking chamber and provided with gravitating pans or shelves arranged or hung around the shaft of said reel from rods attached to the end plates or arms thereof, whereby I produce a continuously baking oven in which the bread or other substances are subjected to the direct action of the gaseous products of combustion ascending from the lower portion or bottom of the oven; second, in an arrangement of flues or openings communicating from the fire-place or fire-places with the baking-chamber directly through
214 the floor of the latter; third, in certain combinations and arrangements of exit-flues, as will be hereinafter described for securing a proper circulation of the gaseous products of combustion through the oven or baking-chamber, both when baking and lighting the fire. The oven represented has two fireplaces, but the number is immaterial to the invention.

A A are fire-places which are illustrated as being formed in brick-work C, with their grates B, and ash pits extending back a suitable distance from the front, as represented in dotted lines in fig. 2, and with coal receptacle H between them. From the back of each fire-place a bed, E, of brick-work is built up, extending to the rear wall of the oven, and forming with the continuation of the fire-place a horizontal space or flue; extending to the rear of the oven D D are a series of flues or openings which lead off from the fire-places, and the spaces over the beds E and communicate directly through the floor C C with the interior of the oven *g*, which is arranged above the masonry, thereby establishing direct communication between the fireplace and baking-chamber. These short flues are the only means of escape for the gaseous products of combustion from the fireplaces, and also of the heat from the furnace, except what little will be absorbed and given out by radiation from the brick-work above the arch in the oven, and they (the flues) are sufficiently numerous to allow of the free and rapid passage of the gaseous products of combustion from the fireplaces directly into the oven and their diffusion through the oven. Between the two furnaces and extending from the front to the rear of the oven directly under the floor thereof is a horizontal flue, I, which communicates with a vertical flue, I′, extending up in rear of the oven, as shown by Fig. 2, and forming or
215 leading to the chimney. The horizontal flue I communicates with the oven through holes in its front and rear which are closed by valves K K, Fig. 2, which valves can be operated from the front of the oven by means of damper-rods C C. This flue I is the exit-flue, by which the gaseous products of combustion escape from the oven through the openings of the valves K K. The rear end of the flue I, which communicates with the flue I′, is enlarged into a chamber and bent downward somewhat in the form of an inverted cone. The point of communication *which* the flue I′ is at the lower part of this chamber. By this en-

largement, and the downward projection of flue I, the draft of flue I′ acts equally upon the contents of flue I, drawing off the same more evenly and freely than if the flue I were continued horizontally out, and opened directly into flue I′.

If the flue I were extended horizontally as stated the draft through the damper opening at the back end of the flue I would be greater than the corresponding opening at the opposite end, but by the enlargement and downward extension of the rear end of the flue I the draft through both damper openings, K, is rendered uniform and the baking operation thus improved and fuel saved.

In the centre of the top of the oven is a valvular opening, L, which communicates with the main flue I′ by a horizontal flue I^2, as clearly represented by the drawings. In the oven G are arranged a suitable number of gravitating pans or shelves, N, which are hung from a reel, composed of rods, N′, extending across between two circular revolving plates R R, which are turned by a shaft S, having its bearing in each side of the oven. The pans containing the bread or other substances are placed on these swinging shelves, N, and this reel
216 with its gravitating pans or shelves is caused to revolve by turning the shaft S. The bread on all the shelves is thus made to receive a uniform heat. The bread pans are placed in and removed from the oven through door P, Fig. 2.

When the fires are built up in the furnaces and the dampers on the top of the oven opened a direct ascending draught will take place, and the smoke and gases of combustion will all escape through the flue I^2, but when the fires are well lighted this damper should be closed, and either or both of the dampers, K K, in the lower central and horizontal flue I may be opened, or partially opened, when a downward draft will take place, and the heated air and gaseous products which enter the oven or baking chamber directly from the fireplaces will rise to the top of the oven on the sides and then descend in the center of the oven to the central flue I, and escape thence up the main flue I′. The heated air and gases will thus be made to circulate and rotate in the oven, and diffuse their heat through the entire oven in a uniform and rapid manner.

What I claim as my invention and desire to secure by letters patent is:

1. The combination of the following elements, to wit: A furnace or fireplace (one or more), a baking chamber arranged above such furnace or fireplace and in direct communication therewith, and a rotating reel located within said baking-chamber and provided with gravitating pans or shelves arranged or hung around the shaft of said reel from rods attached to the end plates or arms thereof, substantially as and for the purpose described.

2. A system of flues communicating between the fireplaces and the interior of the oven directly through the floor or bottom of the latter, substantially as herein described.

217 3. The combination of the flues D, escapes K K, and flue I in the lower part or floor of the oven C′ for the purpose herein shown and described.

4. The flue I having its rear end constructed with an enlargement and downward extension, in combination with the flue I′ substantially as set forth.

5. The combination with the oven, G, of the flues I^2 I′, I D, and the

dampers K, K, & L, as and for the purpose herein shown and described.

DUNCAN McKENZIE.

Witnesses:
T. J. KEANE,
A. J. DE LACY.

218

219 *Sellique patent.*

The U. S. Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy, from the bound volumes of the library of this office, of the specification and drawing in the matter of French letters patent granted M. Sellique, dated September 24th, 1829.

In testimony whereof I, Ellis Spear, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this second day of February, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundredth.

[SEAL.]

ELLIS SPEAR,
Acting Commissioner.

2631.

24 SEPTEMBRE 1829.

Brevet d'invention de dix ans (déchu par ordonnance du roi du 27 décembre 1833).

Pour un four à plancher mobile avec régulateur de température à l'usage des boulangeries et de la marine pour la cuisson du pain.

Au Sieur Sellique (Alexander François) imprimeur et ingénieur-méca'icien, à Paris.

Explication des figures qui représentent ce four.

Pl. 29e, fig. 1re, vue de face.

Fig. 2e, coupe verticale et longitudinale.

Fig. 3e, plan.

a. Bouche de four, dont la longeur est la même que celle de l'âtre, et dont la hauteur est égale à l'épaisseur des pains qu'on se propose de faire cuire dans ce four.

b. Deux branches en fer à rainures servant à supporter les châssis sur lesquels se placent les pains et qui remplacent l'autel; elles doivent avoir un arrêt à leur extrémite, pour qu'en retirant les châssis ils
220 s'arrêtent en position. Ces branches règnent dans toute la longueur du four et la partie qui est en avant du four peut être à charnière, afin de pouvoir se renverser contre le four lorsque on ne s'en sort pas.

c. Atre du four, ayant la forme d'un rectangle.

d. Voûte du four, ayant, sur le devant et au fond, la forme d'une portion de cylindre.

e. Fourneau à vent pour chauffer le four, ayant une porte pour placer le combustible sur la grille.

f. Galerie pour conduire la fumée à la cheminée; elle ramène la chaleur sur le centre de la voûte.

g. Cendrier se fermant par une porte, qui pivote en haut de manière à diminuer ou augmenter le courant d'air.

La porte *h*, qui ferme la bouche du four, est à recouvrement; elle s'élève et s'abaisse au moyen de deux chaînes *i*, qui s'enroulent sur des poulies *k*, qui se meuvent à l'aide d'un levier; cette porte est en fer recouvert d'une plaque de tôle, avec un intervalle de trois pouces, qui est rempli par la centre, afin qu'il y ait peu de déperdition du calorique.

Les poulies *k* sont montées sur un axe qui porte le levier à l'aide duquel on ouvre et ferme la port du four.

l. Trois châssis occupant toute la surface du four et sur lesquels sont posés les pains destinés à la cuisson; ils peuvent être en plus grand nombre. L fond de ces châssis, qui supportent les pains, est une plaque de metal très mince ou une toile métallique ; le fond à jour est préférable au fond plein. Ceux de ces châssis qui seront destinés à l'usage de la marine auront une case pour chaque pain, afin qu'ils ne puissent changer de place par le roulis du bâtiment; ils seront aussi à coullisses, de manière à glisser à leur place avec facilité et sans déviation.

221 Un châssis, *l*, se voit particulièrement à plat et de champ, fig. 4e et 5e. Les fig. 6e et 7e montrent comment et est établi à coulisses sur les bras de fer à rainure *b*.

m, fig. 1re. Voûte servant à serrer le bois destiné à allumer le four.

n. Registre pour fermer la galerie qui conduit la fumée au tuyau de la cheminée.

o, fig. 2e. Pyromètre servant à faire connaître la température de la masse du four.

p. Maçonnerie en briques.

q. Murs en moellons.

r. Couche de charbon ou de cendre.

s. Planches qui enveloppent le tout et qui servent de chemise.

t, fig. 2e. Charge en sable ou autre substance non-conductrice du calorique.

u. Pains posés sur le châssis.

Emploi de ce four.

Pour faire une fournée, on chauffe le plus également possible par les deux fourneaux à vent *e*, ce qui ne présente aucune difficulté ; ces deux fourneaux étant dans la même condition, on chauffe jusqu'à ce que la pyromètre *o* monte à quatre cents degrés; ensuite on ferme les portes du cendrier et le registre *w* de la cheminée puis on attend quelques minutes, pour que la calorique se répartisse mieux en s'équilibrant ; alors les pains étant tournés, on place un des châssis *l* sur les supports *b* et les deux hommes qui ont tourné les pains les placent sur les châssis, ce qui demande peu de temps, n'ayant qu'à prendre ces pains du panneton avec les mains, pour les poser sur ce châssis; lorsque ce dernier est plein, on ouvre la porte de la bouche du four au moyen du levier, et on pousse le châssis dans ce four, en ce servant d'une branche fourchus, qui permet de faire glisser ce châssis sur les supports; aussitôt le

222 châssis dans le four, on ferme la porte, et on recommence, pour chaque châssis, la même marche ; il s'ensuit que, pour enfourner, la porte ne reste ouverte que le temps nécessaire pour enfoncer trois ou quatre châssis, ce qui s'opère en moins d'une minute, tante pour la mise que pour la sortie des pains, il n'y a, par conséquent, aucune déperdition de calorique.

Les châssis étant retirés du four et les pains enlévés, s'il y en a qui ne soient assez cuits, comme cela peut arriver dans tous les four, alors on met ces pains de côté et on les place ensuite sur le dernier châssis, qu'on laisse dans le four jusqu'à l'entière cuisson de ces pains.

Dans les grands fours, au lieu d'une seule porte pour fermer la bouche du four, j'en pratique deux, qui, en conséquence, ferment, chacune, la moitié cette bouche et dans ce cas je mets quatre supports, dont deux au centre, de manière qu'il y a huit châssis pour la fournée entière, ce qui est préférable pour les grandes manutentions.

Il est bon d'observer que ces fours peuvent se chauffer par un seul fourneau à vent; mais je prétère les deux fours pour l'égalité du chauffage.

Je fais circuler, à volonté, sous la partie de l'âtre qui reçoit le coup de feu, un courant d'air frais, pour diminuer la température lorsque cela est nécessaire; ce courant d'air n'est pas figuré dans les dessins. Je mets aussi toutes les fermetures à dix degrés de pente, pour que chacune de ces fermentures appuie naturellement par son propre poids.

Quant aux matériaux, ils sont disposés de manière à perdre le moins possible de calorique; c'est pour cela que je mets différentes couches qui sont plus on moins conductrices du calorique. En général, il faut que les matériaux qui servent pour l'âtre et la voûte soient
223 meilleurs conducteurs que ceux qui leur sont superposés; ensuite il faut employer le mains de conducteurs possibles pour envelloppe afin qu'il n'y ait que très peu de déperdition; pour cette raison, j'emploié la cendre ou le charbon et le bois pour enveloppe.' On doit faire remarquer aussi que, dans les endroits où les boulangers ont besoin de braise, on peut chauffer ce nouveau genre de four en mettant le bois dedans et à l'entrée; à cet effet, on donne plus ou moins d'ouverture à la porte, pour établir le courant d'air nécessaire, ce qui ne nuit en rien à tous les avantages que ce four presénte. Les avantages que présente ce four sont—

1°. D'économiser le combustible, puisqu'il y a moins de perte de chaleur, à cause que la porte ne rèste ouverte qu'une ou deux minutes par fournée;

2°. De mettre le pain au four sans être tenu d'employer un brigadier-boulanger, qui se paie ordinairement fort cher; les boulangers qui ont tournée le pain peuvent faire ce travail avec vitesse et facilité attendu qu'ils peuvent se mettre deux pour poser les pains sur le châssis et qu'ils se servent de leurs mains, au lieu de pelles de quinze pieds;

3°. Que l'espace de temps qui s'écroule entre les premiers et les derniers pains mis au four n'est que de trois à quatre minutes au lieu d'être de dix-sept minutes que l'on compte ordinairement, ce qui fait une *une* très grande différence dans la cuisson;

4°. De chauffer le four toujours au même degré; pour cela, l'homme le plus simple peut suffire; tandis qu'avec la manière ordinaire le brigadier-boulanger seul est chargé de cette opération; et souvent la fait péniblement et toujours approximativement, attendée que la routine seul le guide; de plus, s'il est malade la cusson du pain en souffre, puisque les outres ouvriers n'ont pas même l'habitude pour gouverner;

5°. Que les pains sont aussi propres dessous que dessus parce
224 qu'ils ne touchent jamais à l'âtre et qu'ils ne sont point en contact avec la braise ou la cendre; de plus, l'air chaud enveloppant entier'ment le pain, lui donne une cuisson égale et rend, par cette raison, la croûte de dessous beaucoup plus agréable à manger. On remarquera que l'échelle d'après les dessins qu'on a expliqués plus haut est pour une petite boulangerie, mais que ce même principe est applicable aux boulangeries de toutes les dimensions.

On n'a pas cru devoir non plus ajouter dans les dessins les chaudières, pa'ce qu'il y en a dans tous les fours de boulangerie ainsi que le support au-dessons des châssis à l'endroit où on pose les pains, pour que ces

châssis ne souffrent point dans leur treillage lorsqu'on pose la pâte dessus avec force, dans les boulangeries militaires, où la pâte tient quelque fois au panneton. A cet effet il suffit d'une planche sur laquelle le treillage appuie; cette planche est placée à charnière contre le four, elle se léve et se baisse à volonté.

Principe sur lequel repose la construction de ce four: Le principe de ce four consiste dans la forme rectangulaire, qui permet de lui donner un plancher mobile, formé de trois ou quatre châssis pour que l'enfournement ne tienne qu'un temps très court, et que les pains puissent se placer et se retirer avec les mains à l'aide de plusieurs personnes. Il est bien disposé pour chauffer economiquement et connaître le degré de température que l'on donne à la masse.

Le reste dépend du constructeur, qui peut varier la courbure de la voûte, la pente de l'âtre, etc., mais qui ne peut jamais déroyer au principe qui vient d'être posé sans perdre les advantages qu'il présente.

Ex'd, C. C. W.

(Here follows diagram marked pages 225 & 226.)

227 "*Sellique patent.*"—*Translation.*—*Respondent's exhibit.*

The U. S. Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the bound volumes of the library of this office of the specification and drawing in the matter of French letters patent granted Alexander Francais Sellique.

In testimony whereof I, Ellis Spear, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this twenty-eighth day of January, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundredth.

[SEAL.]

ELLIS SPEAR,
Acting Commissioner.

2631.

September 24, 1829.

Patent of 10 years. (Outlawed by order of the King December 27th, 1833.)

"For an oven with movable bottom and heat regulator for the use of bakeries & the navy for baking bread." Alexander François Sellique, printer & mechanical engineer, in Paris.

Explanation of the figures representing this oven:

Plate 29.

Fig. 1, front view.

Fig. 2, vertical and longitudinal section.

Fig. 3, plane view.

"A," mouth of oven, the length being equal to that of the hearth, & the height equal to the thickness of the loaves to be baked.

"B," two gro'ved iron arms serving to support the frame upon which the loaves are placed, and which replaces the bridge. They should have a check at their extremity so that when the frame is withdrawn
228 they stop in position. These arms stretch across the whole length of the oven, and the front part may be hinged so as to turn over, when not in use, against the oven.

"C," hearth of the oven.
"*d*," vault of oven, its front and back arch shaped.
"*e*," furnace for heating the oven with door to admit fuel on the grate.
"*f*," chamber on flue to conduct the smoke to the chimney; it brings back the heat on the center of the vault "*g*"; ash pan closed with a door which turns above so as to increase or decrease the draft of air.

The door "*h*" which closes the mouth of the oven laps over; it is raised or lowered by means of two chains "*i*," which wind around pulleys "*k*," which are moved by a lever. This door is of sheet iron, with an interval of 3 inches, which is filled with ashes so that there is no waste of heat.

The pulleys "*k*" are mounted on an axis which holds the lever by means of which the door of the oven is opened and closed.

"*l*," three frames occupying the whole surface of the oven and upon which the loaves are placed. Their number can be increased. The bottom of these frames which support the loaves is of thin metal plate, or metallic gauze; the perforated bottom is preferable to the solid. The frames destined for navy or sea ovens have a separate pan for each loaf, so that they are not displaced by the rolling of the vessel; they are also channelled so as to slip in their places without deviation.

One of the frames "*l*" is seen perpendicularly in plane and transverse section of Figs. 4 & 5.

Figs. 6 & 7 show how it is arranged in the gro'ves of the iron girdle arms "*b*."

229 "*m*," fig. 1st, vault to contain fuel wood to kindle the fire or produce the heat.

n, damper to close pipe or flue which conducts the smoke to the chimney.

O, fig. 2, pyrometer to indicate the temperature of the oven.

p, brick masonry.

q, walls of stone.

r, layer of coals or ashes.

s, plates which enclose the whole & serve as a casing.

t, fig. 2, charge of sand or other substance, non-conductor of heat.

u, loaves placed on frame.

USE OF THIS OVEN.

To make a batch of bread, the two air-chambers or ovens *e*, are heated as equally as possible, which is done without difficulty. Being in the same condition, they are heated until the pyrometer O rises to 400 degrees, then the doors of the ash-pan closed & the damper *n* of the chimney, when in a few moments the heat is equally dispersed. The loaves being turned, one of the frames *l* is placed on the supports *b*, and the two men who have turned the loaves place them on the frame, which operation requires very little time, it being only necessary to take the loaves in the hand to put them in this frame. When the last frame is filled the door of the oven is opened, the frame slipped in on the supports, & the door shut immediately, & thus on with each frame of loaves; it follows that the door should be opened only sufficiently long to insert & withdraw three or four frames, which can be done in less time than a minute, thus wasting no heat.

The frames being withdrawn from the oven, the loaves removed, if there are any not sufficiently baked, as this is likely to be the
230 case in any oven; these are placed aside & returned to the east-frame, which is left in until they are done.

In large ovens, instead of a single door, I use two to close the mouth of the oven, each closing one half of the mouth. In this case I use four supports, two of which were in the centre, so that there are eight frames for the entire baking, which is desirable in large establishments.

It is well to observe that these ovens can be heated by a single draft-furnace, but I prefer the two for equalizing the heat. I also place all the doors at ten degrees inclination, that they may close naturally by their own weight.

As to the materials, they are so arranged as to waste as little heat as possible. It is for this reason that I place different layers which are more or less heat conductors. Generally it is necessary that the material which is used for the hearth and the vault of the oven should be a better conductor of heat than that which is superposed. Then the best non-conductors possible should be employed for the casing, in order to waste as little heat as possible. For this reason I use ashes, coal, & wood in the casing. It should also be remarked that where the baker wants embers, this new kind of oven can be heated by placing the wood inside and at the mouth of the oven. In this case the door is opened a little, so as to create sufficient draft, which does not impair in any way the advantages of this oven.

These advantages are:

1stly. Economy in fuel, inasmuch as there is no waste of heat, this door being open only one or two minutes at each baking or batch.

231 2ndly. To place the loaves without the employment of a head baker, which is very expensive, the men or bakers who turn the bread can do the work with great rapidity & facility, inasmuch as they can do so with their hands, and two at once, instead of shovels of fifteen feet length.

3rdly. That the space of time between the placing of the first and last loaves in the oven is from three to four minutes, instead of seventeen, which is ordinarily the time, which makes a great difference in the baking.

4thly. To heat the oven always to the same degree, for which purpose any unskilled person can be employed, while with the ordinary way a head baker is alone charged with this operation, which is performed painfully and with difficulty. Moreover, if he is sick, the bread suffers, as the other workmen cannot fulfill his duties, not knowing how to work the oven.

5thly. That the loaves are as clean on the bottom as on the top, for they never come in contact with the coals, the ashes, or hearth. Moreover, the hot air enveloping the bread entirely, bakes it through & around, so that the lower crust is much more pleasant to eat.

The scale of the plate above described is for a small bakery, but the same principle is applicable to bakeries of all dimensions.

It is not necessary to add the Kettles pans in the drawing, for there are such in all bake-ovens, as also the support below the frames at the point where the loaves are placed, in order that they (the frames) be not injured when the loaves are set down too heavily upon them, as in the case of army bakeries, where the dough clings to the pans. For

232 this purpose it is only necessary to have a board upon which the grating rests. This board is hinged to the oven & can be lowered and raised at will.

Principle of the formation of the oven:

The principle of this oven consists in the rectangular form, which admits of its having a moveable support formed of two or three frames,

that the placing of the bread in the oven may be done in a short space of time, & that the loaves may be inserted & removed by hand, & by several persons at once. It is well adapted for economical heating, & the knowledge of the given degree of temperature of the whole apparatus.

The rest depends on the constructor, who can, if he desires, vary the arching of the vault, the inclination of the hearth, &c.: but who cannot deviate from the above principle without the loss of it advantages.

(Here follows diagram, marked pages 233 & 234.)

235 *Defendants' Exhibit Matthew Carot Patent.*

The U. S. Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a translation from the bound volumes of the library of this office of the specification and drawing in the 1840, No. 7071, for rotary baking oven.
matter of the French letters patent granted Mathieu Carrot, March 31st,

In testimony whereof I, M. D. Leggett, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this twenty-first day of August, in the year of our Lord one thousand eight hundred and seventy-three, and of the Independence of the United States the ninety-eighth.

[SEAL.] M. D. LEGGETT,
Commissioner.

7071.

Patent for five years, dated 31st March, 1840.

To Mr. Matthieu Carrot, (Clément), of Paris:

ROTARY BAKING OVEN.

One of the drawings of Plate II gives views of this oven in section, plan, and elevation, and clearly shows its construction. It is intended for cooking pastry, bread, and all kinds of food, also the desiccation of meat, fruit, vegetables, and plants.

It may also be used for drying or burning brick and other materials, to bake or dry bas-reliefs in clay or plaster, which, by the arrangement of the tablets, may be dried without warping.

This oven is of cylindrical form and traversed by an axis or shaft passing through both ends for the purpose of supporting it and of carrying a motor, either a simple head-crank, or gear-wheels, or
236 a steam apparatus.

It may be adapted to all styles of chimneys, wherein it is suspended and secured on each side of the fire-place.

The shaft is hollow in order that the emanations from within may pass off at both ends, and is provided with two cross-bars, from which are suspended four rotary plates or shelves, which are placed on the material to be cooked or dried.

The rotation of these swinging shelves is independent of that of the cylinder, so that they may arch together or separately; to facilitate the entrance of the articles to be cooked by this arrangement, each plate may be brought at will to the door of the oven.

The rotary movement of the cylinder and plates facilitate the diffusion of caloric so as to avoid burning.

The heating is simple and easy, being effected from the fire-place of a chimney like an ordinary fire below the cylinder, and by means of a sheet of movable iron placed before the chimney the heat is concentrated and the draught regulated at will, the smoke passing up the back without having any effect on the inside of the oven.

Said oven is filled without interruption of the heating process; it is emptied in like manner and immediately.

The oven may be arranged as a fixture or so as to be removed at pleasure, and this may be used without any alteration of the chimney. It is especially useful on shipboard and for armies in the field. The smallest size will cook twenty (20) pounds of bread, the ordinary large size 400 pounds and over. This quantity may be varied according to the need of cooking on the plates or in moulds. The dough may be set to bake, if needed, more or less stiffly, either by hand or by mechanism.

Ex. D.—H. F. R.

(Here follows diagram marked pages 237 & 238.)

239 *Respondents' Exhibit John Ball Patent.*

The U. S. Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the bound volumes of the library of this office of the specification and drawing in the matter of English letters patent granted John Ball, dated November 12th, 1850, No. 13339.

In testimony whereof I, Ellis Spear, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this twenty-eighth day of January, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundredth.

[SEAL.] ELLIS SPEAR,
Acting Commissioner.

A. D. 1850, No. 13339.

BAKERS' OVENS, &C.

Ball's specification.

To all whom these presents shall come, I, John Ball, of Ashford, in the county of Kent, engineer, send greeting:

Whereas Her Present Most Excellent Majesty Queen Victoria, by her royal letters patent under the great seal of Great Britain, bearing date at Westminster the twelfth day of November, in the fourteenth year of her reign, did, for herself, her heirs, and successors, give and grant unto me, the said John Ball, her especial license, full power, sole privilege and authority that I, the said John Ball, my ex'ors, adm'ors, and assigns, and such others as I, the said John Ball, my ex'ors, adm'ors, or assigns, should at any time agree with, and no others, from time to time and at all times during the term of years therein mentioned, should and lawfully might make, use, exercise, and vend, within England, Wales,

and the town of Berwick upon Tweed, my invention of improvements in applying heat to bakers' ovens and their appendages, in which said letters patent is contained a proviso obliging me, the said John Ball, by an instrument in writing under my hand and seal, particularly to describe and ascertain the nature of my said invention and in what manner the same is to be performed, and to cause the same to be enrolled in Her Majesty's high court of chancery within six calender months next and immediately after the date of the said in part recited letters patent, as in and by the same, reference being thereunto had, will more fully and at large appear: Now, know ye that in compliance with the proviso I, the said John Ball, do hereby declare that the nature of my said invention and the manner in which the same is to be performed is particularly described and ascertained in and by the following description thereof, reference being had to the drawings hereunto annexed and to the letters and figures marked thereon (that is to say):

My invention consists in a new arrangement of the flues of bakers' ovens, whereby a greater amount of available heat for heating the oven may be obtained from a given quantity of fuel than heretofore, and after being so applied it may be further profitably employed before escaping to the chimney. The improved arrangement of flues does not relate to any one particular shape or form of oven, but whatever the shape (among the ordinary variety) any baker may require. I cause my fire (emanating from a furnace placed in much the usual position) to enter the oven at about nine inches above the floor instead of as now on a level with the floor of the oven, and then (instead of as heretofore) suffering the flame and heated gases to pass off directly to the chimney nearer the upper part of the oven. I cause the heat, after circulating within the oven, to pass out through two or more flues made at the back, and on a level with the floor of the oven. These flues should be only about three inches high, but as wide as may be necessary to give the fire sufficient draught. From these flues the flame and heated gases are made to descend and pass underneath the floor of the oven towards the front end thereof, where they are made again to descend into another flue, which conducts them away, to act upon a "proving oven" (a well known appendage to bakers' ovens), or the heat thus passed off from the oven may be applied to the heating of water or for other like uses previously to the final escape of the smoke and heated gases up the chimney. The floor of my improved oven I construct of large flat tiles or any other suitable materials, and I sustain this floor by means of iron or other convenient supporters, so as to form a heating chamber underneath the width of the whole oven, and about six inches high, through which the smoke and heated gases pass in returning to the front of the oven, to be carried off and applied as before stated. In the accompanying drawing, forming part of this my specification, I have shown my invention as applied to an ordinary form of bakers' oven.

Fig. 1 is a front view of the oven with the furnace attached to the side thereof. Fig. 2 is a sectional plan taken in the line 1, 2, of Fig. 1. Fig. 3 is a cross-section taken in the line 3, 4, of Fig. 2, and Fig. 4 is a longitudinal section taken in the line 5, 6, of Fig. 2.

a a is the floor, and *b b* the crown of the oven; *c* is the oven door; *d* is the furnace, which may be applied to either side of the oven, and it is connected therewith by a flue, *e*. The flame in passing from the furnace is guided into the oven by a screen of brick work, *f f*, which together with the flue *e*, being raised above the floor, causes the flame to traverse across the oven and play round the walls and heat the crown thereof. The heated gases generated in the furnace then pass

down the flues *g g*, made in the back wall of the oven, into the chamber *h h*, below the floor *a a*, and after traversing along this chamber and heating the floor they enter the flue *i i* at the front part of the oven, and may thence be conducted off to act upon a proving oven as before stated, or to heat water, prior to escaping into the chimney. *k k* are doors for cleaning out the chamber *h h*. The furnace is provided sliding fire-doors *l*, and with similar doors *m* for the ash pit.

Having now described my invention, and the manner of carrying the same into effect, I wish it to be understood that under the above in part recited letters patent I claim the so arranging the flues of bakers' ovens that the flame and heated gases generated in the furnace will be caused to play upon the crown and sides of the oven, and then pass under the floor thereof to heat the same, and after having heated the oven will be available for heating a proving oven, or any other appendage to the bake-house requiring the application of heat.

In witness whereof I, the said John Ball, have hereunto set my hand and seal this tenth day of May, in the year of our Lord one thousand eight hundred and fifty-one.

JOHN BALL. [L. S.]

243 And be it remembered that on the tenth day of May, in the year of our Lord 1851, the aforesaid John Ball came before our said lady the Queen, in her chancery, and acknowledged the specification aforesaid, and all and everything therein contained and specified in form above written, and also the specification aforesaid was stamped according to the tenor of the statute made for that purpose. Enrolled the twelfth day of May, in the year of our Lord one thousand eight hundred and fifty-one.

Jefferson.

Ex. J. A. W.

244

(Here follows diagram marked pages 245 & 246.)

247 *Respondents' Exhibit Vicars English Patent.*

The U. S. Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the bound volumes of the library of this office of the specification and drawing in the matter of English letters patent granted P. & T. Vicars, dated December 22nd, 1852, No. 1138.

In testimony whereof, I, Ellis Spear, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this twenty-eighth day of January, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundredth.

[SEAL.] ELLIS SPEAR,
Acting Commissioner.

Specification in pursuance of the conditions of the letters patent filed by the said Thomas Vicars and Thomas Vicars the younger, in the great seal patent office, on the 21st June, 1856.

To all to whom these presents shall come:

We, Thomas Vicars the elder, and Thomas Vicars the younger, both of Liverpool, in the county of Lancaster, engineers, send greeting:

Whereas Her Most Excellent Majesty Queen Victoria, by her letters

patent bearing date the twenty-second day of December, in the year of our Lord one thousand eight hundred and fifty-two, in the sixteenth year of her reign, did for herself, her heirs and successors, give and grant unto us, the said Thomas Vicars the elder, and Thomas Vicars the younger, her special license, that we, the said Thomas Vicars the elder, and Thomas Vicars the younger, our executors, administrators, and assigns, or such others as we, the said Thomas Vicars the elder, and Thomas Vicars the younger, our executors, administrators and as-
218 signs, should at any time agree with and no others, from time to time, and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man an invention for "Improvements in baking ovens, and in apparatus for placing the bread, biscuits, or other articles to be baked therein," upon the condition (amongst others) that we, the said Thomas Vicars the elder, and Thomas Vicars the younger, by any instrument in writing, under our hands and seals, should particularly describe and ascertain the nature of the said invention, and in what manner the same was to be performed, and cause the same to be filed in the great seal patent office within six calendar months next and immediately after the date of the said letters patent:

Now know ye that we, the said Thomas Vicars the elder, and Thomas Vicars the younger, do hereby declare the nature of our said invention, and in what manner the same is to be performed, to be particularly described and ascertained in the following statement (that is to say):

An arrangement of ovens built parallel, and one above another, in such a way that the whole or any part of the number can be heated at one time from one and the same fire; there being a communication or draught through the whole, but which can be cut off by arrangement of dampers which are hereafter described. The nature of this part of the invention will be readily seen on reference to the annexed drawings, which shows so much of this invention as is requisite to enable any one acquainted with the art to construct ovens according to this inventions of which figure 1 is a ground plan of the ovens;
249 figure 2, section of front elevation (taken from the points *a* to *b* marked on the ground plan, figure 1); figure 3, section of side elevation (taken from the points *c* to *d*, figures 1 and 2), and showing the mode of constructing the horizontal divisions between the ovens for the purpose of causing the draught to have a further distance to pass through the ovens. The coloured parts of the drawings, which indicate the materials proposed to be used in the construction of the ovens, are, red, bricks; brown, tiles; blue, iron. Similar letters refer to like parts.

A, the brick-work forming the outer portion of the structure; B, walls dividing the ovens into two parts, which extend backwards nearly to the extreme end thereof. By this arrangement the heat from the fire place C will have a greater distance to travel through the ovens, and be made effectually subservient to the object in view. C, the fire-place, from which the heat passes in rotation through D, 1, 2, 3, 4, 5, & 6, divisions of the ovens, into E. The chimney F, 1, 2, 3, 4, 5, & 6, dampers to regulate or shut off the draught through oven or ovens *f*, dampers placed in front of the division walls (B) which are to be opened should the back part of the oven get too hot. G, 1, and 2, dampers to cause the draught or rarified air to double or turn in the required direction. H (figure 3), iron girders of an inverted T-shape, by which the horizontal divisions of the ovens are supported. I, tiles with grooves formed in the sides thereof to admit one-half of the lower part of the inverted T-shaped girders (H),

somewhat above their lower surface, so that no part of the bearers will be exposed, being entirely covered by the brick and tile work, thus obviating the great objection made by bakers generally to the use of
250 iron in forming their ovens, and, at the same time, obtaining a perfectly flat and smooth surface to the top of the oven. K (figure 3), false bottom or platform mounted on wheels or rollers upon which the articles to be baked are placed.

L (figure 1 and 3), rails upon which the platform or carriage moves, and which are extended so as to allow the carriages to roll completely out of the oven to be filled with the articles to be baked, and discharged of those baked.

The ovens are provided with suitable doors, ports or slides, to close the fronts thereof during the act of baking.

The part of this invention which relates to the "Apparatus for placing the bread, biscuits, or other articles to be baked therein consists of a number of shelves placed one above another, and supported by or between two or more uprights at each end, which uprights are jointed at the foot to their support, which can be thrown from its horizontal position at will, whereby the shelves are thrown from their flat or horizontal position, so that the articles upon the shelves will be caused to slide off by this arrangement.

The shelves being jointed to the uprights, and the uprights to their support, it will be seen that if the uprights be thrown from their perpendicular the shelves would still retain their flat or horizontal position until thrown therefrom by moving the support to which the uprights are jointed. This arrangement will be readily seen by reference to the drawing. Figure 4, which is an end view of the apparatus, consists of a series of shelves (M) placed one above another, between two or more uprights (three being shown) at each end thereof, and supported by pivots working into the uprights (or any other convenient joint).
251 The two uprights (N and O) are jointed upon the lever (Q) and the third works upon the same axis as the lever (Q). The centre upright is provided with an eye at the upper end thereof to which a cord (weighted if required) can be attached to assist in lowering and raising the apparatus. When in use, the lever (Q) is held in the horizontal position shown, the articles to be baked are placed upon the shelves, after which the movable bottom of the oven is rolled out upon the rails L (which are extended from the front of the oven), to the base of the apparatus, which is then lowered down upon the platform, when the lever (Q) being raised, the whole of the shelves are thrown from their flat to an angular position, thereby causing the articles upon the shelves to slide off on to the movable bottom, which is then rolled into the oven and immediately closed therein, so that as little heat as possible may be lost by opening the oven for filling. By this arrangement of the shelves, it will be seen that upon the uprights being thrown from their perpendicular, the shelves still retain their horizontal position, if the lever (Q) is held in that position, the motion being the same as that of the parallel ruler.

We do not confine ourselves to any particular number of ovens nor to the exact position in which the fire or ovens shall be placed; as, for instance, the furnace shown in the drawings can readily be made subservient to the heating of another set of ovens placed on the other side thereof.

Having now fully described our invention, and the manner in which the same is to be performed, what we claim is the mode of constructing sets of ovens to be heated from one fire, and the manner of filling

252 the same with the articles to be baked, substantially and in the manner as hereuntofore described.

In witness whereof we, the said Thomas Vicars the elder, and Thomas Vicars the younger, have hereunto set our hands and seals this eighteenth day of June, in the year of our Lord one thousand eight hundred and fifty-three.

THOMAS VICARS, SEN'R. [L. S.]
THOMAS VICARS, JUN'R. [L. S.]

Witness:
WILLIAM WALKER,
Of Edge Hill, near Liverpool.
Ex. J. A. W.

(Here follows diagram marked pages 253 & 254.)

255 *Smith's English patent.—Defendants' exhibit.*

The U. S. Patent Office to all to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the bound volumes of the library of this office of the specification and drawing in the matter of the letters patent granted James Smith, dated March 9th, 1854, No. 562, for "Improvement in baking ovens."

In testimony whereof I, J. M. Thacher, Acting Commissioner of Patents, have caused the seal of the Patent-Office to be hereunto affixed, this twenty-sixth day of May, in the year of our Lord one thousand eight hundred and seventy-three, and of the Independence of the United States the ninety-seventh.

[SEAL.] J. M. THACHER,
Acting Commissioner.

Specification in pursuance of the conditions of the letters patent filed by the said James Smith in the great seal patent-office, on the 5th September, 1854.

To all to whom these presents shall come:

I, James Smith, of Liverpool, in the county of Lancaster, biscuit baker, send greeting:

Whereas Her Most Excellent Majesty Queen Victoria, by her letters patent bearing date the ninth day of March, in the year of our Lord one thousand eight hundred and fifty-four, in the seventeenth year of her reign, did, for herself, her heirs, and successors, give and grant unto me, the said James Smith, her special license that I, the said James Smith, my executors, administrators, and assigns, or such others as I, the said James Smith, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend

256 within the United Kingdom of Great Britain and Ireland, the Channel Islands, and the Isle of Man, an invention for "Improvement in baking-ovens," upon the condition (among others) that I, the said James Smith, by an instrument in writing under my hand and seal, should particularly describe and ascertain the nature of the said invention, and in what manner the same was to be performed, and cause the same to be filed in the great seal patent-office within six calendar months next and immediately after the date of the said letters patent:

Now, know ye that I, the said James Smith, do hereby declare the nature of my said invention and in what manner the same is to be per-

formed to be particularly described and ascertained in and by the following statement, reference being had to the accompanying drawings, that is to say: My invention for improvements in baking-ovens have reference mainly to the class of ovens known to biscuit-bakers as "railway ovens," that is, an oven having an endless metal band or platform the width of the oven travelling through it, and upon which are placed the articles to be baked, which is accomplished during their passage through the oven. (These endless bands or platforms are formed by joining together a series of iron plates edge to edge. The band is extended by and works upon two drums, which are mounted upon suitable bearings at the front and back of the oven, and is supported by small wheels or friction-rollers placed on the sides of the band, and which run upon rails fixed within the oven. These ovens are now heated by covered or enclosed flues above and below the oven (or opening), through which the endless band travels. The present system of heating these ovens by enclosed flues is objectionable, on account
257 of the great consumption of fuel required to heat them, and at the same time the want of a sufficient control to enable the baker to regulate the action of the heat within the oven. Now, the object of my invention is, first, to economize the heat and have it more under the control of the baker; and, secondly, to reduce the manual labor in removing the biscuit from the oven to a convenient repository or room above.

To economise the heat, in the first place, I do not enclose the lower flues on the upper side (as now practiced), except the portion immediately above and for a short distance below the fire-place (on places where more than one fire is used), as I have found by experience that the endless metal band or plattorm which travels over it answers all the purpose, the heat acting directly upon it, the intervention of brick work or other substance being dispensed with.

Secondly. I introduce between the folds of the endless band a current or currents of hot air from the *the* fire-place.

Thirdly. I construct the lower side of the upper flue or flues, which are above the travelling bottom, of a series of "louvres" or plates jointed in such a way that they can be readily opened or closed from the exterior of the structure; by removing these louvres for jointed plates which form the bottom of the upper flue or flues from a horizontal position, the heat from the upper flue is allowed to act directly upon the biscuit or other articles within the oven. If preferred, the "louvres" can be dispensed with in ovens where coke, anthracite coal, or other fuel, which emits but little smoke, is used, by introducing currents of hot air above the travelling bottom in the same way as it is done be-
258 tween the folds of the endless band forming the bottom of the oven.

In baking fancy biscuits, it is sometimes deemed desirable to place them on a surface which has a temperature below that of the oven; to accomplish this, it is proposed to cool down the revolving bottom at the point where it receives the articles to be baked, by means of a roller covered with a por'us substance, the lower edge of which revolves in water and the upper in contact with the endless band, or by directing a current of cold air upon it, or any other like convenient method. To reduce the manual labour in removing the biscuits to an upper story, it is proposed to receive them as they fall from the horizontal endless metal band forming the bottom of the oven in a series of small troughs or pockets attached to a vertical endless band working within a chamber heated in conjunction with the oven, by which they are carried up-

wards, and on the first downward motion of the pockets their contents fall into a "shoot" and slide into a basket placed to receive them. By this arrangement, the biscuit is further baked or dried during its passage to the upper story, where they are discharged.

The horizontal endless band forming the travelling bottom of the oven, and the vertical endless band by which the biscuits are carried to the upper story, are set in motion by steam or other motive power applied through the drums or cylinders upon which they are mounted. It is proposed in most instances to use coke to heat ovens constructed according to this invention. That this invention may be more readily understood, hereunto I have annexed a vertical sectional elevation
259 and an horizontal sectional plan of a large oven (having two fire-places) constructed according to my invention; like letters used on the drawings denote similar parts.

Figure 1 is a vertical sectional elevation. Figure 2 is an horizontal section taken from points *a* to *b*. A, brick work forming the exterior and groundwork of the structure. B, fire-place formed with split draughts dividing the hot air and gases so that one portion acts against the lower side of the endless band forming the bottom of the oven, and passes upwards into the heated chamber at the end thereof, and in which works the vertical endless band upon which the elevators are placed; another portion of the heat is carried through or between the folds of the horizontal endless band and into the heated chamber of the vertical endless band, the heat being allowed to escape at the top of the chamber; the other portion of the heat from the fire-places is carried over the upper surface of the horizontal band; and, as this portion of the hot air becomes charged with steam, arising from the biscuits or other articles in the oven, I have provided an independent outlet for this portion of the draught. C, flues with split draughts to carry the heat above and between the folds of the travelling bottom. D, opening of passage to admit the heat between the folds of the travelling bottom. E, outlet or passage through which the heat that has been admitted between the folds of the travelling bottom, and which in this case is carried into the heated chamber of the vertical endless band, but, if preferred, it can be carried directly into a flue. F are "louvres" or jointed cover
260 forming the lower side of the upper flue, which are worked from the exterior of the oven. Y, the broad endless metal band forming the bottom of the oven, and upon which the articles to be baked are placed; *g*, square drums working on axles, and to which the motive power for actuating the endless bottom is applied. H is an opening or passage formed in the brick work for the introduction of a current of cold air to cool down the revolving bottom at the point it receives the articles to be taken, but this will not be found requisite except in the baking of fancy biscuits. I, a vertical endless band, to which is attached K, troughs or pockets into which the biscuits fall from C, the horizontal endless band forming the bottom of the oven, and are carried upwards and discharged at the upper story. L shows the position of a basket placed on the upper floor to receive the biscuits. M, drums upon which the vertical endless band travels, and through which the working power is applied. N dampers used to regulate the draught.

Having now described my invention, and the manner in which it may be performed, what I claim is—

First. The combinations of the various parts, as hereinbefore described, to form an improved baking oven.

Secondly. The direct application of heat to ovens having travelling bottoms, substantially and in the manner hereinbefore described.

Thirdly. The heating of the chamber or passage containing the vertical endless band, as hereinbefore described.

261 Fourthly. The cooling down the horizontal endless band forming the bottom of the oven at the point where it receives the articles to be baked, as hereinbefore described.

In witness whereof I, said James Smith, have hereunto set my hand and seal the second day of September, in the year of our Lord one thousand eight hundred and fifty-four.

JAMES SMITH. [L. S.]

Witness:
WM. WALKER.
Ex'd. A. E. B.

262 (Here follows diagram marked pages 263 and 264.)

265 *Ball's original patent.—Defendants' exhibit.*

The U. S. Patent Office to all to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted Hosea Ball, dated September 23rd, 1856, No. 15753, for "improvement in ovens."

In testimony whereof I, J. M. Thacher, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed the twenty-sixth day of April, in the year of our Lord one thousand eight hundred and seventy-three, and of the Independence of the United States the ninety-seventh.

[SEAL.]

J. M. THACHER,
Acting Commissioner.

No. 15753.

The United States of America to all to whom these letters patent shall come:

Whereas Hosea Ball, of New York, N. Y., has alleged that he has invented a new and useful improvement in ovens, which he states has not been known or used before his application; has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said improvement, and that the same hath not to the best of his knowledge and belief been previously known or used; has paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose.

These are, therefore, to grant, according to law, to the said Hosea Ball, his heirs, administrators, or assigns, for the term of four-
266 teen years from the twenty-third day of September, one thousand eight hundred and fifty-six, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said Ball, in the schedule hereunto annexed, and is made part of these presents.

In testimony whereof I have caused these letters to be made patent, and the seal of the Patent Office has been hereunto affixed.

Given under my hand at the city of Washington this twenty-third

day of September, in the year of our Lord one thousand eight hundred and fifty-six, and of the Independence of the United States of America the eighty-first.

[SEAL.]

GEO. C. WHITING,
Acting Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.

C. MASON,
Commissioner of Patents.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, Hosea Ball, of the city, county, and State of New York, have invented a new and useful imp't in bake-ovens; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing forming part of this specification, in which—

Figure 1 is a vertical section of the oven taken perpendicular to the axis of reel.

267 Figure 2 is a vertical section through the axis of reel.

Similar letters of reference in the several figures denote the same part of the oven.

The nature of my invention consists in constructing the oven with a series of bread receivers swing' between the ends of a reel which is hung in an interior perforated chamber, and is capable of rotation on a horizontal shaft, an arrangement being provided for the safe delivery of the bread from the front of the oven, as will be hereinafter set forth.

In the drawing A is the fire-chamber; B is the ash-pit. The space C above the fire-chamber communicates, by openings *a*, with the vertical side and back flues *c* and *d*, which communicate with the interior chamber by the openings E & E′; across the oven runs the shaft D, to which are secured the plates *f*, so as to constitute a reel within the interior chamber. Between the plates *f* are hung a series of platforms *h*, which will remain horizontal in all positions of the reel, the number depending on the diameter of the reel.

In the front of the oven is a chute, G, leading from the interior outward, on the inner extremity of which are guides *g*, against which the edges of the platforms *h* will come in contact as the reel revolves.

Above the chute G is the opening H for supplying bread to the oven; it is closed by a sliding door, I. The chute will also have a suitable door for closing it during the baking.

The platforms *h* are each in succession brought opposite opening H by the rotation of shaft D and a supply of bread placed upon them.

268 All doors are then closed and the baking commenced. Owing to the perforated sides and back of the interior chamber, all parts of it receive the full heat of the oven, suitable dampers regulating the course of the products of combustion to the chimney.

When the baking is completed the reel is revolved, causing the front edge of each platform to come in contact with the guides *g*, and by the depression thus produced causing the platform to assume the angle of the chute and discharge its load thereon, whence it passes to a receiver outside of the oven.

By this construction all parts of the interior chamber are rendered available for baking purposes, the lower part as well as the upper, the

construction of the baking chamber causing all parts to be equally well heated; the swinging platforms, moreover, favor economy of space in the construction of the oven.

What I claim and desire to secure by letters patent is the perforated interior chamber in combination with the rotary reel and the swinging platforms thereon, self discharging, substantially as set forth.

In testimony whereof I have hereunto signed my name before two subscribing witnesses.

HOSEA BALL.

Witnesses:
GEO. PATTON.
JOHN A. HOLLINGSHEAD.
Ex'd. A. R.

(Here follows diagram marked pages 269 & 270.

271 *Ball assignment.*

The U. S. Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of all assignments under letters patent granted Hosea Ball, dated September 23rd, 1856, No. 15,753.

In testimony whereof I, Ellis Spear, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this thirty-first day of January, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundredth.

[SEAL.]

ELLIS SPEAR,
Acting Commissioner.

S. 10, p. 435.

Whereas I, Hosea Ball, of the city, county, and State of New York, did, on the 23rd day of September, A. D. 1856, obtain letters patent of the United States for an "improvement in ovens," said letters being numbered 15,753; and whereas Joseph Garneau, of the city and county of St. Louis, State of Missouri, is desirous of acquiring an interest therein, and have paid to me the sum of three thousand ($3,000.00) dollars, the receipt of which is hereby duly acknowledged:

Now, therefore, for and in consideration of said sum to me in hand well and truly paid, I have assigned, transferred, and set over, and do by these presents assign, transfer, and set over, unto the said Joseph Garneau all my right, title, and interest in and to said "improvements in ovens," and the letters patent granted therefor, for, to, and in the whole county of St. Louis, State of Missouri, and in no other place or places whatsoever (meaning hereby to release to said Garneau all claims of every kind I may have against him for infringement
272 committed by him in said patent hitherto), the same to be held and enjoyed by the said Garneau for his own use and behoof and for the use and behoof of his legal representatives to the full end of the term for which said letters patent were granted or may at any time or times be extended, as fully and entirely as the same would have been held and enjoyed by me had this grant and assignment not been made.

In testimony whereof I have hereto set my hand and seal this 15th day of August, A. D. 1868.

HOSEA BALL. [L. S.]

[5-cent stamp—H. B.]

STATE OF MISSOURI,
County of St. Louis, ss:

Be it remembered that on the 15th day of August, A. D. 1868, before the undersigned, a notary public within and for said county, appeared Hosea Ball, who is personally known to me to be the person who subscribed the foregoing instrument in writing as party thereto, and *and* acknowledged that he executed the same as his free act and deed, for the uses and purposes therein contained.

Witness my hand and seal the day and year last above written.

[L. S.] SAM'L S. BOYD,
Not. Pub., St. Louis Co., Mo.

Recorded August 19th, 1868.
Ex'd. M. C. S.

273 *Ball extension.*

The U. S. Patent Office.—To all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the certificate of extension in the matter of reissue letters patent granted Hosea Ball, dated June 14th, 1870, for an oven.

In testimony whereof I, Ellis Spear, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this twenty-third day of August, in the year of our Lord one thousand eight hundred and seventy-five, and of the Independence of the United States the one hundredth.

[SEAL.] ELLIS SPEAR,
Acting Commissioner.

Certificate of extension.

Whereas upon the petition of Hosea Ball, of New York, New York, for the extension of the patent granted to him September 23rd, 1856, reissued October 12th, 1869, and again reissued June 14th, 1870, for an "oven," the undersigned, in accordance with the act of Congress approved the 8th day of July, 1870, entitled "An act to revise, consolidate, and amend the statutes relating to patents and copyrights," did, on this 14th day of September, 1870, decide that said patent ought to be extended:

Now, therefore, I, Samuel S. Fisher, Commissioner of Patents, by virtue of the power vested in me by said act of Congress, do renew and extend the said patent, and certify that the same is hereby extended for the term of seven years from and after the expiration of the first term, viz: from the 23rd day of September, 1870, which certificate being duly entered of record in the Patent Office, the said patent has now the same effect in law as though the same had been originally granted
274 for the term of twenty one years.

In testimony whereof I have caused the seal of the Patent Office to be hereunto affixed this 14th day of September, 1870, and of the Independence of the United States the ninety-fifth.

[L. S.] SAMUEL S. FISHER,
Commissioner.

275 *Respondent's Exhibit.—Jennison Patent.*

The U. S. Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted George C. Jennison, dated February 1st, 1859, No. 22809, for improvements in ovens.

In testimony whereof I, Ellis Spear, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this twenty-fifth day of January, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundredth.

[SEAL.] ELLIS SPEAR,
Acting Commissioner.

No. 22809.

The United States of America to all to whom these letters patent shall come:

Whereas George C. Jennison, of Ware, Massachusetts, has alleged that he has invented new and useful improvements in ovens, which he states has not been known or used before his application, has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said improvements; and that the same have not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in the said improvements, and praying that a patent may be granted for that purpose:

These are, therefore, to grant, according to law, to the said George C. Jennison, his heirs, administrators, or assigns, for the term of
276 fourteen years from the first day of February, one thousand eight hundred and fifty-nine, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvements, a description whereof is given in the words of the said George C. Jennison in the schedule hereunto annexed, and is made part of these presents.

In testimony whereof I have caused these letters to be made patent, and the seal of the Patent Office has been hereunto affixed. Given under my hand, at the city of Washington, this first day of February, in the year of our Lord one thousand eight hundred and fifty-nine, and of the Independence of the United States of America the eighty-third.

[L. S.] JACOB THOMPSON,
Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.

J. HOLT,
Commissioner of Patents.

The schedule referred to in these letters patent, and making part of the same.

To all persons to whom these presents shall come:

Be it known that I, George C. Jennison, of Ware, in the county of Hampshire and State of Massachusetts, have invented an improved oven, and I do hereby declare that the same is fully described & represented in the following specification and accompanying drawings, of which—

Figure 1 is a front elevation.

Figure 2 a side elevation.

Figure 3 a vertical and transverse section of it.

Figure 4 is a vertical section taken through the smoke flues.

277 Figure 5 is a horizontal section taken through the lower dampers.

Figure 6 is a side view of a portion of the endless carrier and the pendulous shelves of the same.

My said improved oven is constructed on a different principle from any other known to me; for, while in others the furnace for heating the baking chamber is separate therefrom, so that while the fuel of the said furnace is in a state of ignition the volatile products of combustion cannot be made to heat the baking chamber, except by the passage of the heat through partitions or brick work, whereas in my oven the baking chamber is a long hollow shaft, placed vertically and directly over the fire-place, and made to open freely therein. At the junction of the fuel chamber and baking space one or more discharge flues open out of the same, each of such flues being furnished with a damper at the lower end, and also at the upper part of the baking chamber, and in a passage leading out of the same and into the flue.

Furthermore, openings of delivery and discharge are arranged in opposite sides of the lower part of the baking chamber, and within the said baking chamber and the furnace beneath it an endless carrier, furnished with pendulous shelves, is arranged.

In the drawing A denotes an elongated hollow vertical column, square, or about so, in horizontal section, and covered at top, the lower part of the space within the column being provided with a grate, B, extending across it. An opening, C, made through the front wall of the hollow column B, and just above the grate, is furnished with a door, D, and constitutes the mouth of the furnace or space *a*, extended below

278 the dotted line *b b*, all the space above such line, and marked *c*, being what may be termed as the baking chamber openings E F, made through the front and rear walls of the column, and at the lower part of the baking space, are respectively furnished with sliding doors, G H, and serve to enable access to be had to the shelves of the endless carrier, and for the purpose of supplying the same with dough or articles to be baked, as well as for removing such as may have been baked.

In the front wall *d* are one or more flues, *e f*, which extend upward from and open out of the upper part of the furnace *a*, and terminate in a chimney, *g*, the said flues at or near their opening into the furnace, being respectively furnished with closing slides or shelves, *h h*. These flues have other openings or passages, *i i*, leading into them from the upper part of the baking chamber, each of the said openings *i i* being provided with a closing slide or damper, *k*.

Within the column A, or chamber thereof, is a long endless carrier, I,

which plays around sprocket wheels (or equivalents) K K, L L, fixed on two horizontal shafts, M N, arranged as shown in the drawings.

From each of the hinge bars *l* of the endless carrier a shelf, *m*, is suspended by arms, *n n*, which swing freely on the bar, so as to enable the shaft by its gravitating power to always maintain its horizontal position, at whatever altitude it may be, or during the entire circuit of the carrier.

On the outer end of the lower shaft of the endless carrier a cranked and notched wheel, *o*, may be fixed a pawl, *p*, serving to arrest its motion, or that of the carrier, by being thrown into one of the
279 notches of the wheel. In operating with this oven it is calculated to use anthracite coal, but we are by no means confined to such fuel, as there are various other kinds which will answer. After the upper dampers have been closed, and a fire has been built on the grate, the volatile products of combustion will escape into the flues by means of the openings at their lower ends, much of the heat from such passing upward into the baking chamber, by which means it will become rapidly heated. The temperature within the baking chamber may be controlled by means of the upper dampers, as by withdrawing them more or less we open their passages into the flues and allow more or less of the heated air, steam, &c., to escape.

The bread to be baked is to be supplied to the shelves of the carrier through the supply opening E, the carrier being supposed to have an intermittent movement imparted to it, such as will run each shelf in succession up to the opening E, and their suffer it to remain long enough to receive its supply of dough. As the shelves pass upward into the baking space their dough will be subjected to the action of the heat, and will be baked within a vaporized atmosphere, one containing more or less distilled alcohol. As the shelves successively pass by the opening F the bread on them may be removed from them through this latter opening.

The advantages of my improved oven over others are great economy in fuel, bread bakes without being smoked or injured in the least, and both evenly and thoroughly.

By my arrangement of the baking chamber with respect to the
280 furnace and its flues, viz, so that the said baking chamber shall be vertically over the furnace, and the flues open out of the upper part of the furnace or at the lower part of the baking chamber, the tendency of heat to rise vertically is availed of and the oven heated to the best advantage, while the smoke from the furnace is discharged into the flues and does not pass up into the baking chamber to any injurious extent while the baking process is carried on.

The peculiar arrangement of the charging and discharging orifices E F of the baking chamber with reference to the same, and the smoke eduction passages, not only enables the dough to be applied to the endless carrier, but the baked bread to be removed from it without either materially affecting the baking process of the oven or causing any smoke to escape through the said orifices, as the situation of the mouths of the flues is such as to cause the smoke to enter therein rather than pass upward and out of the openings E F. By means of the upper openings *i i* and their dampers the heat in the baking chamber can be discharged into the flues whenever it may be greater than is required for baking purposes.

I do not claim an endless carrier in combination with and arranged in a baking chamber separated from a furnace or chamber of combustion

by a partition wall or equivalent through which the heat from the furnace has to pass in order to obtain access to the baking chamber.

But what I do claim is the application of the baking chamber
281, 282 of the endless carrier to the furnace in such manner that the air within the said baking chamber may come into direct contact with the furnace charge or heated volatile products arising therefrom, and be heated thereby without the heat having first to pass through any dividing wall or partition or its equivalent.

I also claim the arrangement of the baking chamber with respect to the furnace and its discharge flues, substantially as hereinbefore described and as represented in the drawings, whereby the advantage of the ascending power of the heat is availed of, while the smoke is carried off by the flues. I also claim the arrangement of the charging and discharging orifices of the baking chamber with reference to it and the lower smoke eduction passage leading into the discharge flue of the oven.

I also claim the arrangement and application of the pendulous platforms and the endless carrier together and within the vertical baking shaft.

I also claim the combination and arrangement of one or more openings *i i*, and their damper or dampers, with the baking chamber and its furnace and flues arranged as specified.

In testimony whereof I have hereunto set my signature.

GEORGE C. JENNISON.

Witnesses:
GEO. E. PUFFER.
H. S. CRONELL.

Ex'd. M. C. S.

(Here follows diagram marked pages 283 & 284.)

285 *Defendant's Exhibit "Jennison's Reissue."*

The U. S. Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the reissued letters patent granted Jennison and Rayney, dated March 5th, 1872, No. 4783, for "Improvement in baker's ovens."

In testimony whereof I, J. M. Thacher, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this twenty-first day of May, in the year of our Lord one thousand eight hundred and seventy-three, and of the Independence of the United States the ninety-seventh.

[SEAL.]

J. M. THACHER,
Acting Commissioner.

No. 4783. Reissue.

The United States of America to all to whom these presents shall come:

Whereas George C. Jennison, of Philadelphia, Pennsylvania, assignor to himself and John Rayney, of Brooklyn, New York, has presented to the Commissioner of Patents a petition praying for the reissue of letters patent for an alleged new and useful improvement in bakers' ovens (for which letters patent were issued to him dated February 1st, 1859, which letters having been surrendered, the same have been cancelled and new

letters ordered to issue to said assignees on an amended specification), a description of which invention is contained in the specification of which a copy is hereunto annexed and made a part hereof, and has complied with the various requirements of law in such cases made and provided; and whereas upon due examination made the said claimant is adjudged to be justly entitled to a patent under the law:

286 Now, therefore, these letters patent are to grant unto the said Jennison and Rayney, their heirs or assigns, for the term of fourteen years from the first day of February, one thousand eight hundred and fifty-nine, the exclusive right to make, use, and vend the said invention throughout the United States and the Territories thereof.

In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed, at the city of Washington, this fifth day of March, in the year of our Lord one thousand eight hundred and seventy-two, and of the Independence of the United States of America the ninety-sixth.

[L. S.]

B. R. COWEN,
Acting Secretary of the Interior.

Countersigned:

M. D. LEGGETT,
Commissioner of Patents.

(Here follow 2 diagrams, marked pages 287–290.)

291 4783.

UNITED STATES PATENT OFFICE.

George C. Jennison of Philadelphia, Pennsylvania, assignor to himself and John Rayney, of Brooklyn, New York, improvement in baker's ovens.

Specification forming part of letters patent No. 22809, dated February 1st, 1859; reissue No. 4783, dated March 5th, 1872.

Specification of certain improvements in ovens invented by George C. Jennison, formerly of Ware, in the county of Hampshire, and State of Massachusetts, now of Philadelphia, in the county of Philadelphia, and State of Pennsylvania.

Nature and object of the invention.

This invention is designed to produce an efficient oven for the use of bakers in baking bread, crackers, and similar articles of food; and its principal objects are the economization of the heat of the fire in heating the oven and, at the same time, the securing of such an introduction of the heat into the oven and such diffusion of the heat through it, and also such a shifting of the position in the oven of the articles to be baked during the operation of baking as shall expose the whole thereof to like degrees of heat. The principal features of this invention consist in the construction (hereinafter described) of the oven by which the products of combustion or a portion thereof are admitted directly upward into the the baking chamber in combination with a carrier for changing the position in the oven of the articles to be baked as hereinafter more fully set forth.

Description of the accompanying drawing.

Figure 1 is a front view of an oven embodying my invention. Fig. 2 is a side elevation. Fig. 3 is a vertical transverse section of it
292 through the middle. Fig. 4 is a vertical section taken through the smoke-flues. Fig. 5 is a horizontal section taken through the lower dampers. Fig. 6 is a side view of a portion of the carrier and the shelves attached thereto on which the articles to be baked are placed.

General description.

A is the inclosure which forms the oven or baking chamber, and which also, in the construction represented, incloses the fire-box and ash-pit. This inclosure or oven is covered at the top, and is here represented as being nearly or quite square in its horizontal section and tall in proportion to its breadth, though it will be evident from a full examination of the invention that this oven need not be strictly limited to the proportions here shown. It is provided with a grate, B, placed near the bottom, on which grate the fuel for heating the oven is to be placed; *a*, which is the space below the dotted line *b b*, constitutes the fire-chamber; *c*, which is the space inside of the oven above the line *b b*, constitutes the baking chamber; bottom of the baking chamber opens directly into the combustion or fire-chamber; *c* is an opening into the fire-chamber, which is provided with a door, D, for the introduction of fuel and for other purposes; E and F are openings at the front and back sides of the oven respectively, for the introduction of bread or other articles to be baked, and these openings are provided with sliding doors G and H respectively; I is an endless carrier consisting of four sprocket-wheels K K, L L, fixed on two horizontal shafts M, N, and two sprocket endless chains, made up of links *l*, which are united by round rods extending through both chains as shown in the drawing. Upon these rods brackets *n* are hung in such a manner as to allow them to turn freely upon the rods; *m m* are shelves
293 which are firmly attached to the brackets *n*, and their weight, together with that of the brackets *n*, always keeps them in a horizontal position as shown in the drawing; and when the carrier is operated, the arms *n* turn upon the rods by which they are supported, so as to retain the shelves *m* in this horizontal position. These shelves *m* are designed to receive and support the bread or other article to be baked during the process of baking. In the front wall *d* are one or more flues, *e*, *f*, which extend upward from and open out of the upper part of the furnace *a*, and terminate with a chimney, *g*; said flues being provided with dampers *h h* at or near the opening into them from the furnace. These flues have other openings *i i* into them from the baking chamber, which openings are provided with closing sides or dampers *k*. It is obvious that when the sides or dampers *h h* are closed, and the dampers *k k* opened, the volatile products of combustion must all pass directly upward from the furnace below into the baking chamber, and rising to its top be discharged therefrom through the openings *i i* into the upper part of the flues *e f*, and pass off through the chimney *g*. But if, on the other hand, the dampers *k* are closed, and the dampers *h* opened, their products of combustion must enter these flues at the bottom directly from the furnace and be conducted through them into the chimney, and by partially opening both these sets of dampers a portion of the products of combustion passing through the fire chamber may be

regulated and the consequent heat of the oven modified to suit the circumstances of the case.

Fire having been built upon the grate *b*, and the oven properly
294 heated, the bread or other article to be baked is placed upon the shelves *m* (being introduced through the openings E); said shelves being successively brought into position for that purpose by rotating shaft N which is done by means of a wheel and crank O placed on the end of said shaft and outside of the oven; said wheel being notched on its outer edge, and provided with a catch or pawl *p* to keep it in any desired position. During the process of baking, the position of the different shelves *m* in the oven, and the bread or other articles thereon, may be shifted, as occasion may require, by rotating the shaft *n* by the means already described, and the bread may be removed through the openings E and F or either of them, as may be desired; or the bread may be introduced through one of these openings and removed through the other. In the construction I have described, open communication is left between the furnace and baking chamber so that the heat and products of combustion may arise directly from the heating chamber to the cooking chamber, and properly heat all parts of the latter. It may be observed also that the combination with the baking chamber and furnace of the flues *e* and *f* open at the lower end into the said furnace, has a tendency to draw the heavier products of combustion into the said flues at the bottom and carry them off into the chimney without their entering the baking chamber, while the heat with perhaps some of the lighter products has a tendency to rise directly upward into and in the baking chamber. I prefer anthracite coal for the fuel to be used, but other suitable fuels may be employed.

295 I prefer the construction herein described of the carrier I, with its shelves for receiving the bread, or other article to baked; but while I regard this construction as the best, it is not entirely essential to the realization of a part of my invention that this particular form of carrier should be employed so long as a carrier is employed which will change the position of the bread in the baking chamber.

Claims.

I claim as my invention—

1. Arranging the heating chamber directly under the cooking chamber, and in direct communication with it, in combination with a carrier adapted to change the position in the cooking chamber, of the bread or other material to be cooked.

2. The arrangement of the cooking chamber with respect to the furnace and its discharge flues substantially as herein described, and as represented in the drawing, whereby the advantage of the ascending power of the heat is availed of, while the smoke or principal portion thereof is carried off by the flues.

3. The arrangement of the charging and discharging orifices of the baking chamber with reference to it, and the lower smoke eduction passage leading into the discharge flue of the oven.

4. The combination and arrangement of one or more openings *i i* and the damper or dampers *k*, or equivalent, with the baking chamber and its furnace and flues, arranged as specified.

GEORGE C. JENNISON.

Witnesses:

J. RANKINSHOF.

JOHN J. MILLER.

296

297 *Jennison extension.*

DEPARTMENT OF THE INTERIOR.

U. S. Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the Commissioner's decision in the matter of the application of George C. Jennison for extension of letters patent dated February 1st, 1859, No. 22809, for ovens.

In testimony whereof I, W. H. Doolittle, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this fourth day of August, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundred and first.

[SEAL.] W. H. DOOLITTLE,
Acting Commissioner.

In the matter of the application of George C. Jennison for the extension of letters patent No. 22809, for "improvement in ovens," granted Feb'y 1st, 1859, and reissued March 5th, 1872.

At the hearing of this case an argument in opposition to the extension was admitted, but as no reasons of opposition or testimony had been filed previously, it was necessarily confined to the record.

The first claim of the reissued patent is attacked for want of nevelty in the invention.

The following is the claim:

"Arranging the heating chamber directly under the cooking chamber, and in direct communication with it, in combination with a car'ier adapted to change the position in the cooking chamber of the bread or other material to be cooked."

Among the several references cited only one, the 1856 patent of Hosea Ball, deserves attention; none of the others have the heating chamber arranged "directly under the cooking chamber."

298 In the Ball patent this arrangement is shown, but the heating chamber is not "in direct communication" with the cooking chamber, an important limitation in Jen'ison's claim.

It is true that in the reissued p. ent obtained by Ball it is stated that the communication between those chambers may be either direct or indirect, but the statement is not authorized by the original record, and ought not to have been permitted in the reissue. But even if it were properly in the patent I should not regard it sufficient to impeach the novelty of the invention claimed by Jennison.

It is a mere suggestion without description or illustration to indicate how it may be carried into effect, and under the practice of the office would not be regarded as a satisfactory answer to the claim if it were now before the office for the first time in an original application.

I find the case meritorious in all other particulars, and the patent will therefore be extended.

J. M. THATCHER,
Acting Commissioner.

JAN'Y 31ST, 1873.

Ex. J. A. W.

(Endorsed:) Extension. George C. Jennison. Ovens. Commissioner's decision. Feb. 1st, 1873. Recorded vol. 13, page 379.

299 *Respondent's Exhibit, McKenzie's Downward Draught.*

65.

DEPARTMENT OF THE INTERIOR.

U. S. Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted Duncan McKenzie, dated October 18th, 1872, No. 132305, for imp't in bakers' ovens.

In testimony whereof I, W. H. Doolittle, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this twenty-ninth day of November, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundred and first.

[SEAL.] W. H. DOOLITTLE,
Acting Commissioner.

No. 132305.

The United States of America to all to whom these presents may come:

Whereas Duncan McKenzie, of Brooklyn, New York, has presented to the Commissioner of Patents a petition praying for the grant of letters patent for an alleged new and useful improvement in bakers' ovens, a description of which invention is contained in the specification of which a copy is hereunto annexed and made a part hereof, and has complied with the various requirements of law in such cases made and provided; and whereas upon due examination made the said claimant is adjudged to justly entitled to a patent under the law:

Now, therefore, these letters patent are to grant unto the said Duncan McKenzie, his heirs or assigns, for the term of seventeen years from the fifteenth day of October, in the year of our Lord one thousand
300 eight hundred and seventy-two, the exclusive right to make, use, and vend the said invention throughout the United States and the territories thereof.

In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the city of Washington this fifteenth day of October, in the year of our Lord one thousand eight hundred and seventy-two, and of the Independence of the United States of America the ninety-seventh.

[L. S.] B. R. COWEN,
Acting Secretary of the Interior.

Countersigned.

J. M. THACHER,
Acting Commissioner of Patents.

(Here follow 2 diagrams marked pages 301–304.)

305 UNITED STATES PATENT OFFICE.

Duncan KcKenzie, of Brooklyn, New York. Improvement in bakers' ovens.

Specification forming part of letters patent No. 132305, dated October 15th, 1872.

To all whom it may concern:

Be it known that I, Duncan McKenzie, of the city of Brooklyn, in the

county of Kings, and State of New York, have invented a new and useful improvement in ovens, and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming a part of this specification, and in which figures 1 and 2 represent sectional elevations in planes at right angles to each other of an oven constructed in accordance with my invention, Fig. 1 being a section taken at the lines *x x* in Figs. 2 and 4, and Fig. 2 being a section of the irregular line *y y* in Fig. 4; Fig. 3 is a sectional elevation at the line *z z* in Fig. 4, which latter is a horizontal section at th eline *w w*.

Similar letters of reference indicate corresponding parts. This invention relates to baking ovens in which the bread or other substance is baked by the direct contact of the gaseous products of combustion from the fire or fires, and the same may be advantageously applied to the oven constructed substantially as described in reissued letters patent No. 3929, dated April 19th, 1870, granted Mary Ann Elizabeth McKenzie as assignee of myself, or to an oven constructed as shown in letters patent No. 115626 issued to me June 6th, 1871, and in both of which a system of flues is used, arranged to communicate between the fire-
306 places and the interior of the oven directly through the floor or bottom of the latter. The invention consists in a novel combination and arrangement of flues whereby, after the fire has been fairly lighted and the draft is shut off to prevent direct escape, the gaseous products of combustion and steam or vapory matter eliminated from the substance being baked are all returned from the oven back to the fire-place or ash-pit thereof, thus keeping up the draft from the fire by a return flue or flues back to the fire and utilizing the gaseous products of combustion and vapors of the oven in a most perfect and economical manner.

A represents the baking chamber or oven heated by any suitable number of fire-places, B B, the gaseous products of combustion from which are passed by a system of passages or flues, *b*, *c* and *d*, in a direct manner through the bottom of the oven into and through the baking chamber of the latter, from which the draft may be continued through the top by an opening, *e*, or otherwise, in a direct manner till the fires are fairly lighted, after which the opening *e* may be closed by a damper *f*. The fire-places B B are extended in rear of their grates *g* and ash-pits C. After the fires have been fairly lighted and damper *f* closed the draft is kept up and the gaseous products of combustion, as also the steam or vapory matter eliminated from the bread in baking, allowed to escape on opening a damper *h*, through one or more passages D in the rear portion of the bottom of the oven, which passage or flue that may be arranged between either pair of the fire-places is in communi-
307 cation with a chamber E that connects by openings *i* with the ash-pit C of the fire-places, thus returning the gaseous products of combustion after they have done their duty in the oven back to the fire; also directing steam or vapory matter within the oven after a proper retention therein in the same direction and establishing a return draft through the ash-pits of the furnaces, whereby much economy of fuel is effected and a better baking of the bread or other substance within the oven obtained. F is a revolving bread carrier, which may be constructed substantially as described in either of the two letters patent hereinbefore referred to.

What is here claimed and desired to be secured by letters patent is—

The combination with the baking chamber A of the oven and one or more fire-places B for heating the latter by the gaseous products of com-

bustion entering said chamber, of a return flue or flues D arranged to connect with the ash-pits C of the fire-places, substantially as and for the purposes herein set forth.

DUNCAN McKENZIE.

Witnesses:
FRED. HAYNES.
FRED. TUSCH.

308

309 *Opinion.*

GARNEAU
vs.
DOZIER, WEYL & Co. } Equity.

This is a proceeding in equity for the alleged infringement of two patents.

The points in controversy arise under the first claim of Ball's reissued patent, and also under the first claim of the McKenzie reissued patent. The claim in the Ball patent is invalid for two reasons, to wit: First, lack of novelty; second, it is too broad.

Next the claim under the McKenzie patent is either too broad or limited to a specific device.

Under proper rules of construction most favorable to plaintiff it must be held that the specific device, if any, mentioned in said claim is alone included within the terms of the patent. It is doubtful whether even a specific device such as intimated would show sufficient inventive skill to make the same patentable. However that may be, the defendants are not using plaintiff's device, and therefore are not guilty of any infringement.

Bill dismissed with costs.

310

311 UNITED STATES OF AMERICA,
Eastern District of Missouri, ss:

I, M. M. Price, clerk of the circuit court of the United States in and for the eastern district of Missouri, do hereby certify the writing hereto attached to be a true transcript of the record, proceedings, and exhibits in case No. 560 of Joseph F. Garneau, plaintiff, against Dozier, Weyl & Co., defendants, as fully as the same remain on file and of record in said case in my office.

In witness whereof I hereunto subscribe my name and affix the seal of said court, at office in the city of St. Louis, in said district, this 17th day of July, in the year of our Lord eighteen hundred and seventy-seven.

[SEAL.]

M. M. PRICE,
Clerk of said Court.
By T. L. CRAWFORD,
Deputy.

(Indorsement on cover:) No. 301. Joseph Garneau, appellant, vs. Dozier, Weyl & Company, James Dozier, Augustus Weyl, Louis D. Dozier, and John F. Dozier. E. Missouri C. C. U. S. Filed 15th October, 1877.

ADDITION TO RECORD No. 43.

Stipulation of counsel and addition to record.—Filed 11th September, 1880

Supreme Court of the United States. October term, 1880.

JOSEPH GARNEAU, APPELLANT, *vs.* DOZIER, WEYL & Co. } No. 43.

Supreme Court of the United States. October term, 1880.

JOSEPH GARNEAU, APPELLANT, *v.* DOZIER, WEYL & Co., APPELLEES. } No. 43.

It is hereby admitted and stipulated that the following patents, of which copies are hereto attached, were a part of the record herein upon the hearing in the court below, and that they may be printed and the drawings thereof photolithographed, as a part of the record in this court, and appended thereto, to have the same force and effect as it
2 included in the certified transcript from the court below, to wit, reissued patent of the United States, No. 4026, granted Hosea Ball as a reissue of patent originally granted same September 23d, 1856; and French patent granted M. Covelet June 13th, 1846, with subsequent additions thereto.

It is further agreed that the copies hereto attached may be taken as true copies of said several patents with the same force and effect as if accompanied by the original certificates, of which these annexed purport to be copies.

ROBT. H. PARKINSON,
For Appellant.
WOOD & BOYD,
Solicitors,
& E. BOYD,
Of C'l for Appellees.

The U. S. Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the reissue letters patent granted Hosea Ball, dated
3 June 14th, 1870, No. 4026, for oven.

In testimony whereof I, Ellis Spear, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this first day of September, in the year of our Lord one thousand eight hundred and seventy-five, and of the Independence of the United States the one hundredth.

[SEAL.]

ELLIS SPEAR,
Acting Commissioner.

No. 4026. Reissue.

The United States of America to all to whom these letters patent shall come:

Whereas Hosea Ball, of New York, New York, has alleged that he has invented a new and useful oven (for which letters patent
4 were issued to him dated September 23, 1856; the same surrendered and new letters issued to him dated October 12, 1869; which last letters having been surrendered, the same have been canceled and new letters ordered to issue to him on an amended specification), and has made oath that he is a citizen of the United States; that he verily believes he is the original and first inventor or discoverer of the said invention, and that the same hath not to his knowledge and belief been previously known or used; has paid into the Treasury of the United States the sum of thirty dollars and presented a petition to the Commissioner of Patents praying that a patent may be issued therefor.

These are, therefore, to grant to the said Hosea Ball, his executors, administrators or assigns, for the term of fourteen years from the twenty-third day of September, one thousand eight hundred and fifty-six, the full and exclusive right and liberty of making,
5 using, and vending to others to be used, the said invention, a description whereof is given in the annexed schedule, and made a part of these presents.

In testimony whereof I have caused these letters to be made patent and the seal of the Patent Office to be hereunto affixed.

Given under my hand, at the city of Washington, on this fourteenth day of June, in the year of our Lord one thousand eight hundred and seventy, and of the Independence of the United States of America the ninety-fourth.

W. F. OTTO,
Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.
SAM'L S. FISHER,
Commissioner of Patents.

(Here follows diagram, marked page 5.)

UNITED STATES PATENT OFFICE.

6 Hosea Ball, of New York, oven specification, forming part of letters patent No. 15753, dated September 23, 1856; reissue No. 3666, dated October 12, 1869; reissue No. 4026, dated June 14, 1870.

Be it known that I, Hosea Ball, of the city, county, and State of New York, have invented a new and useful improvement in ovens, of which the following is a description:

Nature and objects of the invention.—My oven is constructed with a series of bread-receiving tables or shelves, suspended from a reel revolving within a chamber, into or through which the direct heat from the furnace is passed and properly distributed.

Description, with reference to drawing.—The accompanying drawing is a sectional view, illustrating my invention. Figure 1 is a vertical transverse section. Fig. 2 is a vertical section, in a plane coincident with the axis of the reel.

Like letters of reference indicate corresponding parts in both views.

7 A represents the fuel-receptacle of furnace, B the ash pit, and C the combustion-chamber, which communicates directly or indirectly, in any proper manner, with the chamber in which the bread-receiving shelves or platforms *h* are revolved. D represents the shafts and *f* the ends or arms of a reel, by which the shelves *h* are suspended and revolved. The flues *c d* and openings *a e e*[1], to permit the passage or circulation of gases into or through the bread chamber, may be located and arranged in any effective manner; and any suitable system of dampers may be employed to regulate the course or strenght of the draft. In front of the oven is an opening, H, employed for the introduction of the bread, and closed by a door, I. A chute, G, may be used for the discharge of bread, and the discharge may be made automatic by guides *g*, with which the edges of the shelves or plat-

8 forms *h* will come in contact as the reel revolves, so as to incline the said shelves to the same angle as the chute. The chute is to be closed by a suitable door during baking operation.

Operation.—The shelves or platforms, *h*, are each, in succession, brought opposite the opening H by the rotation of the shaft D, and a supply of bread placed upon them. The doors are then closed and the baking commenced.

The reel may be rotated as required during the baking operation to apply an equal heat to the bread upon the several shelves or platforms.

When the baking is completed the bread may be withdrawn from each platform in succession through the opening H, or, if preferred, it may be discharged, either automatically or otherwise, through the chute G.

9 *Claims.*—I claim as my invention—

1. One or more swinging bread-holders, suspended from the arms or end plates of a rotating reel, in combination with a furnace so arranged and connected that the products of combustion will pass into or through the chamber within which the bread-holders move.

2. In combination with a rotating reel and swinging bread-holders, a flue on one or more sides of the chamber in which the reel rotates, communicating with said chamber through apertures in the wall between them.

3. In combination with a swinging bread holder revolving in an oven, a discharging chute and tripping device, by which the bread is delivered from its platform and into the chute, substantially as and for the purposes described.

HOSEA BALL.

Witnesses:
EDWARD H. KNIGHT.
JAS. MELDRUM.

10 (Endorsed:) Complainant's Exhibit. Ball reissue. W. B. Hamon, acting examiner.

11 *Defendants' Exhibit "Covelet Oven."*

2319.

Copie du brevet du Sr. Covlet (Louis Joseph), fabricant d'appareils de chauffage, à Paris, rue des Magasins, No. 9. En date du 13 juin 1846. Pour un four circulaire à suspension fixe ou rotative, pour la cuisson des pains, patisseries et autres aliments.

(Local Conservatory of Arts and Trades.)

NOTA.—Brevet index: 1 ière. Addition, page 6; 2e. Addition, page 10; 3me. Addition, page 12.

Description.

Le caractère distinctif de ce four est de tenir les objets à cuire en suspension, different en cela des fours ordinaires ou les objects reposent sur la sole.

Independamment de cette suspension, il y a continuellement déplacement des étagères sur lesquelles les pains sont disposés, afin de régulariser le calorique ou de le repartir d'une manière égale sur tous les objets à cuire, toute fois la mobilité des étagères suspendues, peut être remplacée par une disposition de tuyaux ou d'embranchement qui distriburacint régulièrement la chaleur a toutes les étagères.

Le dessin ci joint qui représente les diverses vues de ce four, permettra d'en faire comprendre la disposition qui est remarquable sous le rapport de sa distribution.

La figure 1re, planche 1 ière, est la vue de face extérieure du four. La figure 2e est la vue opposée. La figure 3e, planche 2e, est une section verticale du four *du four*. La figure 4e en est une section longitudinale.

Le devant du four est fermé par une plaque de fonte A, dans l'évidement de laquelle sont scellées des briques.

Une porte centrale inférieure B, se développe au besoin entièrement et se subdivise en deux compartiments que l'on manœuvre sans développer la porte entière. Les portes latérales C C′ ferment l'entrée de deux fours disposés de chaque côté du foyer vers la partie inférieure du four général.

D D′, portes aboutissant à l'embouchure du four proprement dit, et destinées au chargement et déchargement des étagères.

12 E, indicateur à aiguille et á divisions pour régulariser l'entrée et la sortie des pains de chaque étagère.

F, thermomètre déterminant la chaleur intérieure du four, que l'on peut régler par les valves et soupapes des tuyaux de distribution.

a, figure 2e, pignon dont l'axe correspond au mouvement d'un tournebroche.

b, roue en contact avec ce pignon, et montée sur un arbre dont le pignon. *c* engrene avec la grande roue *d* placée sur l'arbre *e* qui porte les croisillons des étagères. Cette commande qui existe sur le derrière du four, est supportée par un batis, *f*. Tout le pourtour du four est extérieurement en maçonnerie; on peut même conserver un vide à l'intérieur de la maçonnerie sur tout son pourtour, pour éviter le rayonnement de la chaleur du four dans l'appartement voisin.

L'organisation intérieure du four est disposée comme suit:

Le foyer G est alimenté de coke ou de houille; sa grille *g*, dont un barreau est indiqué sous plusieurs vues (voir fig. 5), est constituée dans les conditions les plus favorables à la juste répartition de l'air et à la conservation des barreaux.

(Stamp of Conservatory of Arts & Trades.)

Le foyer est surmonté d'une plaque H qui le ferme supérieurement, une petite voute rapportée I, repose sur cette plaque, et en contrehaut une plaque concave J, garantit les étages inférieurs d'un coup de feu trop

vif. Les étagères K, au nombre de six, plus ou moins, sont suspendues aux extrémités de deux croisillons L, de manière à osciller et à occuper une position stable, malgré la mobilité rotative de tout le système.

La flamme et la fumée qui s'élèvent du foyer, prennent la direction indiquée par les flèches des fig. 3 et 4; ainsi elles se dirigent à droite et à gauche dans les conduits *h*, arrivées à la partie supérieure, elles redescendent dans les conduits symetriques *i*, à la partie inférieure desquelles la fumée se surchauffe par son passage à l'intérieur de la voute presqu'incandescente I; puis la fumée s'élève de nouveau dans un troisième parcours vertical *j*, pour se rendre alors dans la cheminée.

Dans ce triple parcours, symétrique de chaque côté, à l'intérieur du four (voir fig. 3), le calorique est utilisé aussi avantageusement que possible. La voute supérieure du four est fermée par des briquettes; au dessus, est disposé un réservoir d'eau M, à couvercle et à robinet pour le service; l'eau de ce réservoir s'échauffe facilement par la chaleur intérieure du four, qui n'a à traverser que la faible épaisseur des carreaux de la voute N.

Les fours latéraux OO′, disposés vers la partie inférieure du four à panification, servent pour les rotis et aliments culinaires; leur présence est nécessitée par le système à suspension des étagères. L'air extérieur débouche par les tuyaux d'appel *l*, qui traversent le massif du foyer G et forment embranchement au pourtour des fours OO′; cet air s'échauffe à un haut degré en traversant le massif incandescent du foyer, ou en règle l'energie par des tirettes à soupapes *m m′*; à la sortie du circuit des fours OO′, cet air chaud renouvelle l'air du four.

La porte B du foyer G est dessinée intérieurement, fig. 6e, avec conduite d'air qui ont issue sur le côté du foyer, de manière à souffler cet air aux angles de la plaque concave J, pour lancer le calorique du four vers la partie supérieure.

Le mouvement des croisillons des étagères opéré par le tournebroche ou par tout autre moteur à ressort, a pour objet d'effectuer le
13 déplacement continu des étagères, afin de repartir mieux la chaleur pour la cuisson; certaines parties du four tendent à être d'une température plus élevée; or le changement de positions des étagères régularise la cuisson.

Le thermomètre, en indiquant la température intérieure de four, permet de la régler en donnant issue á la chaleur du four par une soupape adhérente au tuyau de fumée, soupape que l'on manœuvre en conséquence pour donner issue à l'excédent de chaleur.

(Seal.)

Ainsi ce four se fait remarquer par la suspension des étagères qui supportent les pains ou autres aliments, par le déplacement rotatif de ces étagères; toutefois, dans le cas où ces étagères, resterait ent stationnaires, des tuyaux indiqués en lignes rouges, fig. 3e, aboutissant au foyer ou dans son massif, viendraient distribuer la chaleur à chaque étagère.

Le service de chargement et de déchargement des étagères, est indiqué par l'indicateur à divisions E, qui donne l'ordre successif du service. La chaleur du four se règle par un thermomètre, et on en varie la température par une soupape communiquant du four au tuyau de fumée.

Des soupapes règlent également et distribuent l'air échauffé au pourtour du foyer à l'intérieur du four pour en renouveler l'air.

La circulation est favorable à la cuisson régulière des pains et des aliments.

Ce four peut aussi s'établir de toutes formes et de toutes dimensions,

avec plus ou moins d'étagères; la suspension des pains ou objets a cuire, présente l'avantage d'ue cuisson plus régulière et de disposer dans le même four comparativement une plus grande quantité de pains.

Ce four est enfin susceptible de diverses matières sa construction.

Paris le 13 Juin, 1846.

(Signé) COVLET.

Vu pour être annexé au brevet de quinzeans pris le 13 Juin 1846 par le Sr. Covlet.

Paris, le 11 Août, 1846.

Pour le ministre et par délégation :

Le maître des requêtes, directeur,

(Signé) A. SENAC.

1ière addition au brevet due Sr. Covlet (Louis Joseph) en date du 7 Juin 1847, pour un four circulaire à suspension fixe ou rotative, &ac.

Addition consistant dans le perfectionnement et dans la disposition modifiée du four à suspension et étendant l'emploi du four à la dessication de toutes substance et matériel.

Description.

Cette addition a pour objet, 1°, une disposition perfectionnée du four primitif à suspension; 2°, une modification que ce système du four est susceptible de recevoir; 3°, l'extension de son usage non seulement à la cuisson des pains et aliments, mais aussi à la dessication des substances et matiéres quelconque.

Le four à suspension dont les dessins annexé à ce mémoire, don-
14 nent deux dispositions spéciales, présente les deux caractères distinctifs suivants: 1°. L'isolement du foyer et sa combustion à l'aide du coke on charbon de terre, préférablement au bois, que je n'exclue pas cependant dans certains cas; 2°. La suspension des objets à cuire ou à dessecher sur des étagères mobiles dont le déplacement continu et régulier a pour but de repartir le calorique d'une manière égale sur tous les points.

La disposition perfectionée du four est représentée dans les fig. 1, 2, et 3 des planches 1 et 2.

(Seal.)

Deux thermomètres *aa'*, dont l'échelle est apparente sur la face extérieure du four, fig. 1re, pl. 1re, donnent d'une manière precise le degré de chaleur intérieure, et permettent d'obtenir dans le travail, une régularité constante pour la cuisson ou la dessication.

Deux séries de tuyaux en fonte ou tôle fort de fer *bb*, isolés de la maçonnerie, circulent en serdentin à l'intérieur contre la paroi du four, et ne laissent partir la fumée que lorsqu'elle a abandonné son calorique au profit du four.

Un cadran *c*, à aiguille indicateur fixe, est placé sur l'axe *d* des étagères *e*, et permet de retirer les objets dans l'ordre où ils ont été enfournés; il porte alors Nos. 1, 2, 3, 4, et correspondant au nombre variable des étagères *e*, nombre indiqué et limité à quatre sur cette disposition.

Des régistres et soupapes *f*, ménagés aux alentours du foyer *g*, donnent la facilité de régler la chaleur au degré convenable.

Une lampe à reflecteur est placée au fond du four dans l'épaisseur de la maçonnerie, à la hauteur des deux bouches ne service *h h'*, et donne dans l'interieur de four, une clarté qui permet d'enfourner et de défourner sans tâtonnement.

Le foyer *g*, qui ainsi que les bouches *h h'* du four, et les fours secondaires latéraux, sont garnis de portes avec toutes leurs ferrures. Le calorique se réfléchit contre le dôme *l* du foyer. La flamme et la fumée se dirigent alors dans les tuyaux en serpentins *b b* et s'échappent en dernier lieu dans le conduit de cheminée *q*. Quand à l'air chaud, il circule comme l'indiquent les flèches de la coupe longitudinale, fig. 3, pl. 2. La chasse du four est en maçonnerie bardée de fonte et de fer, avec un vide dans son épaisseur, formant matelas garni de poussier pour concentrer la chaleur à l'intérieur.

Une disposition modifiée du four à suspension est détaillée dans les coupes, fig. 4. et 5, pl. 3. La circulation de la fumée et de l'air chaud se fait à l'instar de la disposition précedente, à l'aide des tuyaux *b* et des régistres *f*. Le foyer y est également isolé et à dôme mais les étagères *e*, dont le nombre ici est porté á six, au lieu d'être suspendues aux ailes d'un croissillon, sont suspendues à une chaine sans fin *r*, par l'intermédiare des galets *s*, roulant sur un chemin de fer *t*, or cette chaine qui est guidée et tendue par les roulettes *u*, reçoit son mouvement de translation d'un pignon *v*, dont l'axe est muni d'une manivelle, ou bien est mis en communication avec au méchanisme de tournebroche ou tout moteur analogue.

La mobilité des étagères se fait à volonté, d'une manière permanente ou intermitente; au besoin la position des étagères, peut être stationnaire au moyen de tuyaux qui apporteraient et repartiraient le calorique à chacune d'elles.

La façade de ce four est analogue à celle du four précédent, avec les mêmes accessoires, et dans l'épaisseur de la maçonnerie, est logée une chaudière *x*, d'une capacité variable, pour le service du pétrin; à cette chaudière aboutit un conduit à robinet pour déverser de l'eau sur la plaque de fonte incandescente du foyer, afiin d'obtenir une buée factice pour faire fonctionner le four à la mode allemande.

(Seal.)

Le foyer indiqué, fig. 5, pl. 3, par des hachures sur la teinte, est isolé du reste du four; c'est un foyer mobile sur galets et s'emboitant au point *z* avec les tuyaux fixes *b*, par lesquels s'échappe la fumeé. La bouche du four est fermée par une double porte ou rideau à bascule dont les deux panneaux en fonte sont reliés par une chaine roulante sur des galets y à l'instar des régistres des chaudières à vapeur.

Cette disposition modifiée, me paraît moins simple que la précédente, j'ai cru devoir toutefois l'indiquer pour mémoire, et comme susceptible d'être employée dans certaines localités. Ces deux dispositions reposent sur le même principe de four à suspension ou à étagères qui forme le caractère fondamental de mon invention pour la cuisson et la dessication des pains, aliments et substances en général; mais un point non moins important, est le fait des régistres, qui placés près du foyer, donnent au besoin accès à l'interieur due four, à l'air qui aspiré du dehors, s'échauffe au pourtour du foyer et par son introduction à l'intérieur du four par les régistres, en augmente, règle ou varie la temperature intérieure.

Paris, le 7 Juin 1847.

(Signé) COVLET.

Vu pour être annexé au certificat d'addition pris le 7 Juin 1847, par le Sr. Covlet.

Paris, le 30 Août 1847.

Pour le ministre et par délégation:

Le maître des requêtes, directeur,

(Signé) A. SENAC.

2ème addition au brevet du Sr. Covlet (Louis Joseph), en date du 12 Juin 1847, pour un four circulaire à suspension fixe ou rotative, pour la cuisson des pains, patisseries, &a.

Addition consistant dans l'emploi d'âtres mobiles en terre réfractaire, pour la suspension des objets à cuire ou à dessécher.

Description.

Independamment du mode à suspension sur des étagères, des objets à cuire en à dessécher, le four formant l'objet de mon invention se fait remarquer par l'ensemble de la disposition, entrautres, par l'emploi de régistres à courant d'air. La fonction de ces régistres, comme je l'ai déjà indiqué, consiste à distribuer, au besoin, à l'intérieur du four, pour en varier la température, un courant d'air, qui puisé, naturellement de l'extérieur par des bouches, s'échauffe au pourtour du foyer.

Je viens appuyer de nouveau sur un point aussi important, le fond mobile des étagères.

J'établis ces fonds mobiles en terre réfractaire disposée en carreaux qui pour des étagères de un mètre de large sur deux mètres de
16 profondeur, portent un mètre de large sur cinquante centimètres de profondeur.

(Seal.)

Ces carreaux dont l'épaisseur varie de trois à six centimètres se placent au nombre de quatre à la suite l'un de l'autre pour constituer le fond mobile d'une étagère.

Le dessin annexé à cette demande, fait voir dans la fig. 1re, que représente l'un de ces carreaux en terre réfractaire ou autre terre cuite, que les carreaux se placent à volonté sur une plaque de tôle reposant sur des équerres ou coulisseaux adhérents aux étagères, ou, comme l'indique la fig. 2e, directement sur les équerres ou coulisseaux des étagères, avec faculté d'être changés ou déplacés au besoin; ces carreaux dont les dimensions sont d'ailleurs variables, présentent comme caractère distinctif, un fond mobile, ou âtre mobile en terre cuite ou réfractaire.

La fig. 3e du même dessin donne plusieurs vues du foyer avec ses chaudières et un bouilleur au bout du foyer, dans le but de fournir une buée destinée à faire fonctionner le four à la mode allemande.

En résumé, cette addition a pour objet de completer la description des diverses parties perfectionnées et constitutives, contribuant indispensablement à la bonne fonction du systême de four à suspension pour la cuisson du pain, des aliments, et dessications des substances et matières en general.

Paris, le 11 Juin 1847.

(Signé) COVLET.

Vu pour être annexé au certificat d'addition pris le 12 Juin 1847.

Paris, le 30 Août 1847.

Pour le ministre et par délégation:

Le maître des requêtes, directeur,

(Signé) A. SENAC.

3me addition au brevet du Sr. Covlet (Louis Joseph), mécanicien, rue St. Laurent No. 18, à Belleville (Seine), en date du 19 Octobre 1848, pour un four circulaire à suspension, &c., addition consistant dans la pose du dit four sur une voiture.

Description.

Les expériences réitérées sont venues prouver par d'excellents résultats, toutes les prévisions que cette nouvelle combinaison devait amener, l'on peut même dire qu'elles ont été dépassées, car non seulement les pains de toutes sortes ont été cuits avec la plus grande perfection et aussi proprement que l'on peut le désirer, mais l'économie de combustible est telle, que si l'on donnait le chiffre, il paraitrait incroyable même aux personnes qui ont l'habitude de s'occuper de ces sortes de questions.

(Seal.)

Le gouvernement ayant en connaissance de cette invention à donner des ordres pour en faire l'acquisition, et je suis en train d'en monter un à la manutention de la guerre à Paris.

17 Les résultats remarquables et tout à fait extraordinaires, qui je le répète, sont le fruit de l'expérience, m'ont conduit à rechercher, s'il ne serait pas possible de les employer en faveur de l'armée en campaigne, qui souvent trouve, soit des farines, soit des blés, et qui pourtant manque de pain ou bien celui que l'on fait est de très mauvaise qualité, faute des appareils nécessaires pour le préparer d'une manière convenable, alors ce pain est loui de réparer les fatigues supportées par les homnes, d'un coté par les intempéries des saisons et de l'autre par les marches forcées, &a., &a.

Ces conditions du reste ont été comprises depuis longtemps, car sous l'empire, l'administration a fait accompagner l'armée par des petits moulins portatifs, il en a été aussi transporté en Afrique, pour l'armée d'occupation ; or donc, il ne serait pas sans importance et sans de grands avantages, d'avoir aussi un four portatif qui puissi cuire parfaitement le pain ou le biscuit avec le minimum de combustible possible.

Dans ce but, j'ai disposé mon four de manière à le monter sur une voiture, de façon qu'il soit le plus transportable possible, tout en l'entourant de matières conservatrices de la chaleur, afin d'éviter les déperditions qui seraient la suite naturelle du mouvement de cette voiture.

En outre, cette voiture-four, ou voiture boulange, peut porter le combustible, des seaux, des panetons, au besoin même, une cure à eau pouvant aussi servir à pétrin le pain.

Cette disposition est représentée en coupe verticale et longitudinale par les dessin ci-joint : On voit en *a*, les surfaces où l'on pose les pains, chaque surface peut conteuir deux rangeés de cinq pains, ce qui fait quarante pains, les surfaces a^1 peuvent recevoir chacune cinq pains, ce qui donnerait soixante pain de un kilogramme cinq cents ou quatre vingt dix kilos de pain qui pourrait être parfaitement cuit en cînquante minutes, soit à l'aide du charbon de terre, ou du bois, soit avec du coke.

On voit que sous le siège *b*, on peut placer les panetons, et que la partie *c*, ou le derrière de la voiture, peut servir de magasin à combustible, des seaux peuvent être placés sous la voiture ainsi que la caisse à eau.

Cette voiture, comme on le voit, peut être monteé sur ressorts avec

avant train, afin de faciliter tous les mouvements qu'elle peut avoir besoin d'accomplir.

Pour les dimensions respectives et même la combinaison de toutes les différentes parties, on comprend que je derrai m'entendre avec les officiers du génie et du coprs qui o'occupe spécialement de la constructions des équipages du train.

(Seal.)

Je n'ai voulu ici que constater mon droit spécial à faire un emploi plus étendu de mon four et prouver qu'il peut rendre de véritables services, non seulement aux habitants à demeure fixé, mais encore à l'armée en campagne, aux nonveaux coulons en Afrique, à la marine, &a., car on comprend de quelle importance peut être l'économie de combustible, par exemple, dlans un navire, pour un voyage de long cours, ce qui permet de remplacer le biscuit par du pain frais.

Un verrou est disposé pour empêcher le balancement du mécanisme qui porte les pains afin d'éviter tout accident pendant la marche de la voiture.

Paris, le 19 Octobre 1858.

(Signé) COVLET.

18 Vu pour être annexé au certificat d'addition pris le 19 Octobre 1848, par le sr. Covlet.

Paris, le 29 Décembre 1848.

Pour le ministre et par délégation.

Le secrétaire général :

[SEAL.] (Signé) FLEURY.

Pour copie conforme et des plans ci-dessus aux plans originaux déposés aux archives du Conservatoire des Arts et Métiers.

Le général de division, directeur du Conservatoire des Arts et Métiers.

[SEAL.] (Signeé) MORIN.

Paris, le 12 Février 1873.

Vu pour légalisation de la signature de Mr. le Général Morin, directeur du Conservatoire des Arts et Métiers.

Paris, le 13 Février 1873.

Pour le ministre et par autorisation.

Le conseiller d'état, secrétaire général,

[SEAL.] (Signed) J. V. ZUNIER.

Le ministre des affaires étrangerès certifie véritable la signature de Mr. V. Zunier, Paris, le Fevrier 1873. Par autorisation du ministre:

Par le sous-directeur, chef de la chancellerie,

[SEAL.] (Signed) T. DUBOIS.

Seal of the minister of foreign affairs and the signature of Mr. Dubois duly legalized at the consulate general.

Feb'y 13, 1873.

{ SEAL AMERICAN CONSULATE-GEN'L. } (Signed) F. J. COLE,
U. S. Deputy Consul-General.

(Endorsed:) 6811. Offered by defendants April 3d, 1877, and admitted subject to objections. 6811. Langles offered by defendants, May 20th, 1875. M. T. S., 1.

DOCUMENTS NOS. 16 AND 17.

Translation of Covlet's patents.

A copy of Louis Joseph Covlet's b'evet.

Oven apparatuses manufacturer, No. 9 rue des Magazins, Paris. Under date June 14th, 1846. For a circular bake-oven, suspended, stationary, or rotary, for baking bread, confectionary, and other alimentary food.

Description.

The distinctive features of this oven is to hold suspended the bread to be baked, differing, in that, from ordinary ovens, where the bread is laid on the oven bottom or sole.

Apart from this suspension, there is a continual rotation of the shelves upon which the loaves are laid, in order to regulate the heat or to distribute it in equal parts on all the bread to be baked. However, the motion of the suspended shelves might be substituted by a series of radiating flues, which would uniformly distribute the heat to all the shelves.

19 The annexed drawing representing the different views of this oven will enable to form a comprehensible idea of the remarkable manner in which its various parts are devised relative to its distributed.

Figure 1, plan 1, is the front exterior view of the 'ven.

Figure 2 is the opposite view.

Figure 3, plan 2, is a vertical section of the oven.

Figure 4 is a longitudinal section.

The oven front is closed by a cast-iron plate, A, which is fixed with brick work. The lower central door, B, unfolds itself fully when necessary, and subdivides into two compartments which are worked without unfolding the entire door. The side doors, C C, close the opening of two ovens, situated on each side of the furnace, toward the lower part of the oven proper.

D D are doors terminating at the opening of the oven proper, and used for placing on and removing the bread from the shelves.

E is an indicator, for the purpose of regulating the entrance and withdrawing of the bread from the shelves.

F is a thermometer, showing the interior heat of the oven, which may be regulated by the valves and dampers of the flues.

a, figure 2, is a pinion, whose axis corresponds with the motion of a spring-power.

b, a wheel moved by the above pinion, and set on a shaft, whose pinion, C, actuates the large wheel, D, set on the shaft, E; this last shaft carries the arms of the pans. This set of wheels for the transmi'tion of power is supported by a frame, F, and is at the rear of the oven.

The whole exterior of the oven is entirely brick work; a space may be left in the interior of the walls, in order to avoid loss of heat through radiation.

The interior arrangement of the oven is as follows:

In the furnace G coal or coke is burnt; its grate, *g*, of which a bar is illustrated under different views (see fig. 5), is so constructed as to obtain the most favorable result in the draft of air required, and the preservation of the grate bars.

The top of furnace is formed with a cast-iron plate, H; a small arch, I, rests on said plate, and a concave plate, J, protects the lower shelves from the action of too intense a heat. The shelves K, six in number, more or less, are suspended at the ends of the arms L, so as to swing and keep stationary, notwithstanding the rotatory motion of the whole system.

The gases and smoke arising from the furnace follow the direction showed by the arrows in the figures 3 and 4; from there, they continue right and left in the flues *h*; when they have reached the top, they come down in the flues *i*, in the lower part of which the smoke is superheated in its passage through the interior of the arch I, made almost incandescent; then the smoke arises again through the vertical flue *j*, and finally escapes through the chimney. During that triple transit, sym'etrical on each side of the oven (see Fig. 3), the heat generated is utilized to its greatest extent.

The upper arch of the oven is made with small bricks; above the arch for use is a tank, M, with cover and cock. The water in this tank is easily heated by the interior heat of the oven crossing through the thickness of the arch N.

The lateral ovens O O, situated in the lower part of the oven proper, may be used for the purpose of roasting meat and culinary food. These small receptacles are due to the form of the system of suspended shelves has.

Air enters through the flues *l*, then through the wall forming the furnace G, and radiates around the receptacles O O; that air is heated to a high temperature in its transit through the hot walls of the furnace; the draft is regulated by dampers *m m*, in its exit from the small ovens O O; that air is thereby used for the oven supply.

Door B, of furnace G, is an interior drawing (Fig. 6), with its air flues, which issues on the side of the furnace, so as to blow that air towards the angles of the concave plate J and send the oven heat toward the upper part.

The motion of the pan arms, transmitted by the spring apparatus, or any other power, has for its object the continual displacement or motion of the shelves, in order to better distribute the heat for the baking, certain parts of the oven having a tendency to be hotter than others; the motion, or change of position of the shelves regulates the baking process; while the thermometer indicates the interior temperature of the oven, it facilitates the regulation of the heat by using a damper, made in the smoke flue, which damper may be used, if desirable, to get rid of an excess of heat.

Thus this oven is remarkable by the suspension of the shelves, which hold the bread or other food; by the rotatory displacement of its shelves; however, should these shelves stay stationary, flues indicated in red lines (Fig. 3), terminating at the furnace, would distribute the heat to each shelf.

The successive operation of placing on and taking the bread off the shelf is shown by an indicator, E, which marks its successive order.

The heat of the oven is regulated by means of a thermometer, and may be varied by using a damper, communicating from the oven with the smoke flue.

The draft is also regulated by dampers, which distribute at will the air already heated around the furnace.

The motion is favorable to the baking of loaves and other food.

Finally, this oven may be built in all shapes and in all sizes, with more or less shelves. The suspended position of the loaves, or other

food to be baked, gives them a more uniform baking, and allows comparatively the placing of a greater quantity of loaves in the oven.

The building of this oven is not restricted to one particular kind of material; but several may be used.

Second addition to Louis Joseph Covlet's brevet, under date June 12, 1847. For a circular, suspensory bakeoven, stationary or rotatory, for the baking of bread, pastry, etc.

This addition consists in the use of movable shelves, the bottoms of which are made with suitable tiles for the suspension of objects to be baked or desic'ated.

Description.

Independently of the manner in which the objects to be baked or desic'ated are suspended on shelves, the forming the object of my invention is remarkably by the entirety of its position, notably for the use of air dampers.

The working of these dampers, as I have already mentioned, consists in distributing, when needed, in the interior of the oven, so as to
21 vary the temperature, a current of air, which, attracted from the exterior by opening, is heated around the furnace.

I again call attention to the important fact that of the movable bottom of these shelves: These movable bottoms are clay tiles, in squares, which for shelves 1 metre wide by two metres in depth measure 1 metre in width by 50 centimetres in depth. These squares or tiles vary in thickness from 3 to 6 centimetres; and four of said tiles constitute the movable bottom of the shelf.

The annexed drawing to this memorial shows in Fig. 1 an illustration of one of these tiles, made in any of the usual processes of brick-making; also that these tiles are placed at will on the sheet iron bottom resting on the angles, enabling the renewal of the same when necessary.

Figure 3 of the same drawing gives several views of the furnace with a tank and boilers at the end of the furnace, with the view of furnishing a supply of steam in the oven, after the German fashion. Finally, the object of this addition is to complete the description of the several improved parts, contributing indispensably to the effectual working of the suspensory oven system, for the baking of bread and food and the desic'ation of all substances in general.

Third addition to Louis Joseph Covlet's brevet, under date of October 19th, 1848. For a circular suspensory bake-oven, &c. Addition consisting in the setting or putting of the same on a vehicle.

Description.

Repeated experiences have proven by their excellent results the realization of all the expectations that were to arise from this new combination; it may even be said that they have been more than realized, inasmuch that not only loaves of all kinds have been baked with great perfection and with as much cleanliness as may be desired, but the economy of fuel is such that, if figures were given, it would appear incredible, even to persons having experience of such matters.

This invention having come to the knowledge of the government, it has ordered the purchase of one, which I am at present building for the war department in Paris.

These remarkable and extraordinary results, which, I now repeat, are the fruits of experience, have led me to seek whether it would not be practicable to employ the same in favor of the army when out in a campaign, which oftentimes on its route finds flour and wheat, and notwithstanding has no bread, or has bread of a very inferior quality, for the want of a proper apparatus to prepare it in a suitable manner, which (bread) is far from relieving the soldiers from the fatigues and forced marches or the inclemency of the weather, &c., &c.

These facts have been so well understood that, under the empire, the war department had ordered small portable mills to accompany the army; some were also sent to Africa for the use of the army of occupation. It would not, then, be without importance and advantage to have a portable oven capable of baking well the bread or biscuits with the least possible quantity of fuel.

To that end I have arranged my oven so as to set it on a vehicle in order to facilitate its transportation, while at the same time covering it with a suitable substance in order to avoid the loss of heat which would be occasioned by the motion of the vehicle.

22 Furthermore, this "oven vehicle" may carry the fuel, the buckets, baskets, and even a small tank, which may also be used for the purpose of kneading the dough.

This combination is shown by the vertical and longitudinal cut in the annexed drawing. A are the surfaces on which the loaves are laid; each surface may hold two rows of five loaves, making forty loaves.

A′ are surfaces holding five loaves each, which would make sixty loaves, weighing one kilogramme, five hundred, or ninety kilogrammes, capable of being baked in fifty minutes with either wood, coke, or coal.

It will be seen that under the seat B the baskets may be stored, and that part, C, or the rear of the vehicle, may be used for the carriage of fuel; the buckets and tanks can be placed under the vehicle.

This vehicle, as may be seen, may be placed on springs with forecarriage in order to facilitate the movements which it may have to undergo.

For the dimensions, and even the respective combination of the different parts, it will readily be understood that an understanding with the engineer corps would be required.

I not only aimed here to establish my sole and exclusive right to make a more extensive use of my oven, and prove that it may be made useful, not only to the inhabitants of cities, but also to an army in a campaign, to the colonists in Africa, to the navy, &c., &c., for it will be understood of what importance the economy of fuel would be, for instance, to a ship during a long voyage, when fresh bread could be substituted *to* hard bread.

A bolt is so arranged as to prevent the swinging of the mechanism holding the loaves in order to avoid all or any accident while the vehicle is under way.

First addition to Louis Joseph Covlet's brevet, under date June 7th, 1847. For a circular suspensory bake-oven, stationary or rotary, addition consisting in the improvement and modified arrangement of the suspensory oven, and extending the use of the oven to the dessic-'ation of all bodies and matters.

Description.

The object of this addition is to show: 1st, an improved arrangement of the original suspensory oven; 2d, a modification that this system of

oven is susceptible of receiving; 3d, the extension of its use to the baking of bread and food, but also to the dessic'ation of all bodies and matters whatsoever.

The suspensory oven, the drawings of which are annexed to this memorial, shows two specific dispositions, presenting the two following distinctive features: 1st, the insulation of the furniture and its combustion, aided by coke or coal in preference to wood, which, however, is not excluded in certain cases; 2d, the suspension on movable shelves of matters to bake or dissic'ate, of which the regular and continual displacement has for object the distribution of the heat in an equal manner on all points.

The improved arrangement of the suspensory oven is shown by Fig. 1, 2, & 3 of plans 1 & 2; two themometers, *a a*, the scales of which are apparent on the exterior front of the oven. Fig. 1st, Pl. 1, give precisely the degree of heat in the interior, and allows a constant regularity in the labor of baking or desic'ating.

Two series of cast or sheet iron flues, *b b*, insulated from the brick work, extends in a serpentine manner in the interior against the sides of the oven, thereby preventing the smoke from leaving until it has abandoned all its heat to the benefit of the oven.

Hand dial C, as a stationary indicator, is placed on the axis *d* of shelves *i*, and allows the removal of the bread in the order in which it has been placed in the oven. The dial bears the numbers 1, 2, 3, 4, corresponding with the variable number of the shelves *e*, number indicated and limited to 4. On this arrangement the valves and dampers *f*, placed around the furnance G, gives the facility to regulate the heat to a suitable degree.

A lamp, with a reflector, is placed in the oven in the thickness of the wall to the height of the two openings, *h h*, thereby giving in the interior of the oven a light sufficiently bright to enable to place in and discharge the bread from the shelves without hesitation.

The furnace *g*, which, as well as the openings *h h* of the oven, and the lateral or smaller ovens, are furnished with doors, with all necessary iron work appertaining thereto.

The heat reflects against the arch, L, of the furnace; the gases and smoke are then directed in the serpentine flues, *b b*, and escape lastly in the flue of the chimney, Q; as to the hot air, it circulates as indicated by the arrows of the longitudinal cut, Fig. 3, Pl. 2.

The walls of the oven are brick work, strengh*t*ened with suitable wrought or cast iron plates, with an empty space, left during the building, and filled with any suitable dust or sand, in order to concentrate the heat in the interior of the oven.

A modified arrangement of a suspensory oven is detailed in cut Fig. 4 & 5, plan 3; the circulation of the smoke and hot air is had in a manner similar to the preceding arrangement, aided by flues *b* and dampers *f*, the furnace *g* is equally insulated and arched, but the shelves *e*, of which the number herein is brought up to six, instead of being suspended to the arms, are suspended to an endless chain, *r*, by the aid of rollers, *s*, moving on an iron railway, *t*; now this chain, which is stiffened and guided by rollers *u*, receives its translocative motion from pinion *v*, whose axis is provided with a crank, or otherwise is put in communication with a mechanism similar to some spring power, or any other analogous motor.

The mobility of the shelves is made at will in a permanent or intermittent manner; if needed, the position of the shelves can be made

stationary by means of flues carrying and subdividing the heat to each shelf.

The front of this oven is similar to that of the preceding oven with the same appertainings; over the oven, in the brick work, is placed a tank, *x*, of varying size, for the use of the trough; connected with the tank is a cock for the purpose of running water on the hot cast iron plate, in order to generate a ficticious oven steam, thereby using the oven after the German fashion.

The furnace mentioned, Fig. 5, plan 3, by short cross lines on the blue tint, is insulated from the remainder of the oven. This furnace is movable on rollers and connects at point *z* with stationary flues *b*, through which the smoke escapes.

The mouth of the oven is closed by a double drop-door, the two
24 panels of which are connected with a chain moving on rollers *y*, similarly worked to boiler-dampers.

This modified arrangement appears to me more complicated than the preceding one; I have thought proper, however, to mention it, as it is susceptible to be employed in certain localities; these two dispositions rest upon the same principle of the suspensory shelf-oven, which forms the fundamental principle of my invention, for the baking of bread and food, and the dessic'ation of all substances in general.

Not less important is the fact that the dampers placed near the furnance admit, when required, in the interior of the oven the air, which, attracted from outside, is heated around the furnace, and by its introduction in the oven through the dampers increases, regulates, or varies the interior temperature.

Translation of certificates attached to Covlet's patent, additions thereto, and to the drawings, made by order of the court.

Original.

Pour copie conforme et des plans ci-dessus aux plans originaux déposés aux archives du Conservatoire des Arts & Métiers.

Le général de division, directeur du Conservatoire des Arte & Métiers,

MORIN.

Paris, le 13 Février 1873.

Translation.

The foregoing is a true copy of the original, and the above plans are true copies of the original plans deposited in the archives of the conservatory of arts & trades.

The general of division, director of the conservatory of arts & trades.

MORIN.

PARIS, 13*th February*, 1873.

Original.

Vu pour légalisation de la signature de Mr. le Général Morin, directeur du Conservatoire des Arts & Métiers.

Paris, le 13 Février 1873.

Le ministre de l'agriculture et du commerce.

Pour le ministre et par autorisation :

Le conseiller d'état, secrétaire général,

V. ZUNRE.

Le ministre des affaires étrangeres certifie véritable la signature de Mr. V. Zunre.
Paris, le 13 Février 1873.
Par autorisation du ministre:
Par le sous-directeur, chef de la chancellerie,

T. DUBOIS.

25 *Translation.*

In verification of the signature of General Morin, director of the conservatory of arts and trades.
Paris, 13 February, 1873.
The minister of agriculture & commerce.
For the minister & by authorisation:
The member of the State council, secretary general.

V. ZUNRE.

The minister of foreign affairs certifies as genuine the signature of Mr. V. Zunre.
Paris, 13th February, 1873.
By authorization of the minister:
By the sub-director, chief of the chancellery.

T. DUBOIS.

CERTIFICATES TO DRAWINGS.

Original.

Vu pour être annexé au brevet de quinze ans du 13 Juin 1846, par le Sieur Covelet,
Paris, le 11 Août 1846.
Pour le ministre et par délégation:
Le maître des requêtes, directeur,

A. SENAC.

Pour copie conforme:
Le général de division, directeur du Conservatoire des Arts et Métiers,

MORIN.

PARIS, *le* 2 *Novembre* 1872.

Translation.

Verified to be annexed to the patent for 15 years, of date 13 June, 1846, obtained by Mr. Covelet.
Paris, August 11, 1846.
For the minister and by delegation:
The master of requests, director,

A. SENAC.

True copy:
The general of division, director of the Conservatory of Arts & Trades,
MORIN.

PARIS, *November* 2, 1872.

Original.

Vu pour être annexé au certificat d' addition pris le 7 Juin, 1847, par le Sieur Covlet.
Paris, Août, 30 1874.
Pour le ministre et par délégation :
Le maître des requêtes, directeur,

A. SENAC.

26 Pour copie conforme :
Le général de division, directeur du Conservatoire des Arts et Métiers,

MORIN.

Translation.

Verified to be annexed to the certificate of addition obtained by Mr. Covlet, June 7, 1847.
Paris, August 30, 1874.
For the minister & by delegation :
The master of requests, director,

. A. SENAC.

A true copy :
The general of division, director of the Conservatory of Arts and Trades,

MORIN.

Original.

Vu pour être annexé au certificat d'addition pris le 7 Juin 1847, par le Sieur Covlet.
Pour le ministre & par délégation :
Le maître des requêtes, directeur,

A. SENAC.

Pour copie conforme :
Le général de division, directeur du Conservatoire des Arts et Métiers,
MORIN.

Translation.

Verified to be annexed to the certificate of addition secured by Mr. Covlet, June 7th, 1874.
For the minister & by delegation :
The master of requests, director,

A. SENAC.

True copy :
The general of division, director of the Conservatory of Arts & Trades,
MORIN.

Original.

Vu pour être annexé au certificat d'addition pris le 7 Juin 1847, par le Sieur Covlet.

Paris, le 30 Août 1847.
Pour le ministre & par délégation :
Le maître de requêtes, directeur,

A. SENAC.

Pour copie conforme :
Le général de division, directeur du Conservatoire des Arts & Métiers,
MORIN.

PARIS, *le* 18 *Février* 1873.

27 *Translation.*

Verified to be annexed to the certificate of addition obtained by Mr. Covlet June 7, 1847.
Paris, August 30, 1847.
For the minister & by delegation :
The minister of requests, director,

A. SENAC.

A true copy :
The general of division, director of the Conservatory of Arts & Trades,
MORIN.

PARIS, *February* 18, 1873.

Original.

Vu pour être annexé au certificat d'addition pris le 18 Juin 1847, par le Sieur Covlet.
Paris, la 30 Août 1847.
Pour le ministre et par délégation
Le maître des requêtes, directeur,

A. SENAC.

Pour copie conforme :
Le général de division, directeur du Conservatoire des Arts & Métiers,
MORIN.

PARIS, *le* 12 *Février* 1873.

Translation.

Verified to be annexed to the certificate of addition obtained by Mr. Covlet June 18, 1847.
PARIS, *August* 30, 1847.
For the minister & by delegation :
The master of requests, director,

A. SENAC.

True copy :
The general of division, director of the Conservatory of Arts & Trades,
MORIN.

PARIS, *February* 12*th*, 1873.

Original.

Vu pour être annexé au certificat d'addition pris le 19 Octobre 1848, par le Sieur Covlet.
Paris, le 29 Décembre 1848.
Pour le ministre & par délégation.
Le secrétaire général,

FLEURY.

Pour copie conforme :
Le général de division, directeur du Conservatoire des Arts & Métiers,
MORIN.

PARIS, *le* 23 *Février* 1873.

Translation.

Verified to be annexed to the certificate of addition obtained by Mr. Covlet October 19, 1848.
28 Paris, 29 December, 1848.
For the minister & by delegation :
The secretary general,
FLEURY.

A true copy :
The general of division, director of the Conservatory of Arts & Trades,
MORIN.

PARIS, 13 *February*, 1873.

(Here follow 7 diagrams.)

(Indorsement:) Supreme Court U. S. 1880, October term, No. 43. seph Garneau, applt., vs. Dozier Weyl & Co. Stipulation of counsel and addition to record. Filed 11th Sept. 1880.

OCT
JAMES H.

Robert Clarke & Co., Printers, Cincinnati, O. [October, 1880.

SUPREME COURT OF UNITED STATES.

OCTOBER TERM, 1880.

Joseph Garneau, *Appellant,*

No. 43.] *v.*

Dozier, Weyl & Co., James Dozier, Augustus Weyl, Louis I. Dozier, and John F. Dozier.

BRIEF FOR APPELLANT.

ROBERT H. PARKINSON,
Counsel for Appellant.

Pour copie conforme :
Le général de division, directeur du Conservatoire des Arts & Métiers,
MORIN.

PARIS, *le* 23 *Février* 1873.

Translation.

Verified to be annexed to the certificate of addition obtained by Mr. Covlet October 19, 1848.

28 Paris, 29 December, 1848.

For the minister & by delegation :
The secretary general,
FLEURY.

A true copy :
The general of division, director of the Conservatory of Arts & Trades,
MORIN.

PARIS, 13 *February*, 1873.

(Here follow 7 diagrams.)

(Indorsement:) Supreme Court U. S. 1880, October term, No. 43. seph Garneau, applt., vs. Dozier Weyl & Co. Stipulation of counsel and addition to record. Filed 11th Sept. 1880.

FILED
OCT 18 1880
JAMES H. McKENNEY, CLERK

Robert Clarke & Co., Printers, Cincinnati, O. [*October, 1880.*

SUPREME COURT OF UNITED STATES.

OCTOBER TERM, 1880.

Joseph Garneau,
Appellant,

No. 43.] *v.*

Dozier, Weyl & Co., James Dozier, Augustus Weyl, Louis I. Dozier, and John F. Dozier.

BRIEF FOR APPELLANT.

ROBERT H. PARKINSON,
Counsel for Appellant.

Robert Clarke & Co., Printers, Cincinnati, O. [*October, 1880.*

SUPREME COURT OF UNITED STATES.

OCTOBER TERM, 1880.

Joseph Garneau, *Appellant,*

No. 43.] *v.*

Dozier, Weyl & Co., James Dozier, Augustus Weyl, Louis I. Dozier, and John F. Dozier.

BRIEF FOR APPELLANT.

STATEMENT OF CASE.

This is an appeal from the Circuit Court of the United States for the Eastern District of Missouri.

The case was heard below on bill, answer, replication, and proofs, and a decree dismissing the bill was entered. From this the complainant appealed.

The suit is for infringment of two patents on bake-ovens.

The first is reissue No. 4026, granted Hosea Ball, June 14, 1870, being a reissue of a patent originally granted him September 23, 1856.

The second is reissue No. 6397, granted Duncan McKenzie, April 20, 1875, being a reissue of a patent originally granted Mary A. E. McKenzie, as assignee of Duncan McKenzie, May 1, 1860.

Both of these patents are upon extended terms. They will be referred to respectively as the Ball Reissue and the McKenzie Reissue.

The complainant sues as assignee of both patents for

St. Louis County, Missouri. Both parties are carrying on the baking business in the city of St. Louis.

The pleadings are in the usual form. The defendants deny infringment, novelty, and patentability under each reissue, and insist that the reissues are not for the same inventions as the originals upon which they are founded.

The Court below, without specifying the reasons upon which its opinion was based, simply held the Ball Reissue invalid for want of novelty and because too broad, and the McKenzie Reissue not infringed.

It did not indicate any particular prior device regarded as anticipating the first, but appears to have proceeded on the theory that it was sufficient that among all the prior patents it could select elements which, with some changes in their structure and mode of operation, might have been combined to form the patented machine. It did not indicate the features of the defendant's oven regarded as substantially distinguishing it from the second patent.

ASSIGNMENT OF ERROR.

The court erred:

First. In finding the complainant not entitled to the relief asked in the bill of complaint, and in not granting said relief.

Second. In dismissing the bill of complaint.

Third. In finding the Ball Reissue invalid.

Fourth. In not finding that the invention therein described and claimed was original with the patentee, novel and useful; that it was properly described and claimed in said reissue and secured thereby; that said reissue was in all respects good and valid; that the complainant was the owner of the exclusive privileges claimed therein for the county of St. Louis, Mo.; that the same had been and was being infringed by the defendants in said county; and that the complainant was entitled to the relief thereunder prayed in said bill of complaint, and decreeing accordingly.

Fifth. In finding the McKenzie Reissue not infringed.

Sixth. In not finding that the invention therein described and claimed was original with the patentee, novel

and useful; that it was properly described and claimed in said reissue, and secured thereby; that said reissue is in all respects good and valid; that the complainant was the owner of the exclusive privileges claimed therein for the county of St. Louis, Mo.; that the same had been and was being infringed by the defendants in said county; and that the complainant was entitled to the relief thereunder prayed in said bill of complaint, and decreeing accordingly.

TITLE.

The title of the complainant to the several patents is not controverted. The assignment of the Ball Reissue to him is found on page 121 of the record, and the assignment of the McKenzie Reissue on page 47. The grant of the extended term to Ball is found on page 122. The grant of the extended term to McKenzie, on page 101.

The assignments in each case expressly include the extended term.

STATE OF ART PRIOR TO BALL INVENTION.

One of the earliest forms of bake-ovens was the brick chamber in which the heating and baking were effected alternately instead of simultaneously.

The fire was first built in the chamber. When its walls had become sufficiently heated, the fire was withdrawn and the bread introduced, being usually placed upon the floor of the oven. The baking was accomplished by radiation of the heat accumulated in the walls of the oven. The heating and baking could not proceed simultaneously.

Another form of oven consisted of a chamber of some kind situated above, or otherwise in close proximity with, a separate furnace. The heat from the furnace was radiated through the oven walls, which were constructed of brick, stone, or metal.

This allowed the heating and baking to be carried on simultaneously, but utilized but a small proportion of the heat.

A variety of improvements, or attempts at improve-

ments upon these primitive forms had been made before the date of the Ball invention.

A French patent to M. Sellique shows an oven arranged behind a furnace, with the dough placed upon the floor of the oven, and a current of heat, carried by the draught of the furnace over the dough, to the escape-flue.

An English patent to Thomas Vicars, Sr., and Thomas Vicars, Jr., shows an oven consisting of fixed horizontal partitions, arranged one above the other. The dough is placed upon these horizontal partitions, and a current of heated air is carried successively though the spaces between these partitions and over the surface of the dough arranged upon them.

An English patent to James Smith, granted just before the Ball invention, shows a long, horizontal flue, serving as an oven, with a metallic band or platform the entire width and length of it constituting its floor and so arranged that it can be actuated to move the bread in a horizontal plane from front to rear of this flue. The bread is designed to be placed upon this platform at one end and pass out at the other end. Two furnaces are shown near one end of the oven—both entirely and carefully covered—and a current of hot air is introduced beneath the platform, and another current above the platform, by means of side flues connecting with the furnace, and is swept through to the discharge chimney carrying with it such soot, smoke, and ashes as may pass to that chimney.

A French patent to Mathew Carrot shows a close revolving oven, evidently constructed of metal, and heated by a furnace without and entirely separate therefrom. The bread is placed on suspended shelves, which remain stationary during the revolution.

A French patent to Joseph Covelet shows a close oven heated only by radiation, with four pans designed to be revolved.

These are the only patents prior to the Ball patent, which have been referred to by defendant's expert. It does not appear that any of the ovens shown in them ever went into operation. No evidence is offered to show any prior

uses affecting the state of the art. It may, therefore, be assumed that these patents show the nearest approaches to the Ball invention which had been made prior to his patent.

BALL INVENTION.

The object of the Ball invention was to contrive an oven in which the bread should be exposed upon all sides to the constant action of the heated gases, or direct products of combustion from the flame, unmodified by radiation through any intervening wall, and without the waste incident thereto; in which the largest possible quantity of bread could be exposed to the unrestricted action of the heated gases within a given distance from the flame; in which the tendency to uneven baking, due to the draught of heated currents through the baking chamber, should be overcome by carrying the bread in constant motion through every part of the baking chamber, exposing it in constant succession to the different currents; and which should, at the same time, afford a convenient and rapid means of introducing and delivering the bread.

This he has done by constructing a perforated baking chamber above a furnace, of such proportions as to admit of the revolution within it of a cylindrical reel of a size so nearly commensurate with the chamber itself as to occupy substantially all the room available for baking purposes, attaching to this reel a series of pendent shelves extending longitudinally with it, so arranged that they shall not intercept the heat from each other, and shall constantly change their vertical and horizontal plane with the revolutionof the reel, and so pivoted that they shall remain horizontal during such revolutions, and passing the heated gases from the flame into and through this baking chamber in their rising course, so that they shall come directly in contact with the bread as it is suspended in and carried around this baking chamber.

These heated gases directly from the flame are introduced into this baking chamber through circuitious passage ways and intermediate lateral flues connecting with the perforations in its walls, and when there are retained and

allowed to circulate in contact with the bread, which is arranged upon the pendent shelves of the reel. At the front of the baking chamber is a suitable opening for the introduction of the bread extending its entire width. The shelves are loaded and unloaded as they are successively presented by the revolution of the reel. A single revolution is sufficient for baking.

By this structure and combination of elements, the inventor economizes heat, space, labor, and time, while securing a rapid and uniform bake.

See in this connection *Dep. Millward*, *Rec. p.* 40, *ans.* 6. This invention is thus summed up in the first claim, which is as follows:

> "1. One or more swinging bread-holders suspended from the arms or end plate of a rotating reel, in combination with a furnace so arranged and connected that the products of combustion will pass into or through the chamber within which the bread-holders move."

MCKENZIE INVENTION.

This invention is an improvement on that of Ball.

Though the Ball oven was so constructed as to expose the bread upon the shelves of the revolving reel directly to the heated gases coming from the combustion chamber, and to enable them to circulate about it, there was a very considerable loss of effectiveness owing to the following incidents:

First. Much of the heat in transit from the combustion chamber to the baking oven was radiated through the outer walls of the intermediate lateral flues.

Second. Much of it was lost through its rising to the top of these lateral flues before entering the baking chamber.

Third. The exit flue, being at the top, caused a portion of the heated gases to pass off through it without coming in contact with the bread on the reel.

Fourth. The introduction of these gases at the side of the baking chamber made them much less effective than if introduced through the bottom, and so as to rise directly

from the furnace through the floor of the baking chamber, and thence be diffused over this floor.

Fifth. The only exit of the draught being at the top, more or less smoke and soot was liable to be carried into contact with the bread.

Ball, like all his predecessors, seems to have understood that it was impracticable to suspend the bread in the line of draught over the furnace opening directly into it, on account of the contact of soot and smoke and the liability to scorch, and to have inserted his intermediate lateral flues as a neceessary protection against this.

The object of McKenzie's invention was to save and utilize this lost heat, and apply all the heat in such a manner as to give it the greatest possible effectiveness, while at the same time retaining the advantages of the Ball combination.

It was understood, at the time, that a considerable continuous draught from the furnace was required to support the necessary combustion. If the bread was suspended in the line of the draught, as in Ball's oven, it would be exposed to scorching, and to the contact of smoke and soot, unless protected, as in that oven, by an intercepting partition. If the amount of draught required to maintain thorough combustion was provided by a flue other than through the baking chamber the principal part of the heat would be carried off with it, and so lost.

In his experiment McKenzie found, as he states in his testimony, that the wet dough itself supplied the place of a draught, and that if it could be passed in and out of the oven continuously, and with sufficient rapidity, the combustion could be preserved without any appreciable draught. This, he says was an entirely new idea to him, and his explanation of it is, that the wet bread took up the heat and formed a partial vacuum. The real explanation of the phenomenon which he thus discovered in baking is, probably, that the decomposition of the vapors thrown off from the moist bread, when brought in contact with the intensely heated products of combustion from the flames beneath, with the consequent application of oxygen, served

to facilitate that combustion in the same way as the vapor from a locomotive exhaust when applied just above the furnace, or, as often in great conflagrations—the stream of water from the fire-engines, dashed into fine spray by a high wind before it reaches the flames, and vaporized and decomposed by their intense heat, serves to stimulate, not to extinguish, them.

Using the fact, without stopping for a scientific solution of it, he found that he could dispense, both with the arrangement which carried the soot and smoke through the bread with the current of heated gases, and the other arrangement which carried a large portion of the heated gases up a chimney rising directly from the furnace without passing them into or through the baking chamber, and could obtain the advantage of a direct application of the heated gases to the baking bread in their upward course from the flame without any division or loss of quantity or efficiency, and without the danger of scorching, blackening, or disflavoring the bread.

Like Ball, he employed a baking chamber, a reel revolving in that chamber, a furnace directly beneath that chamber, and communicating with it so as to pass the products of combustion from the furnace into it, and thus into direct contact with the bread. But, instead of carrying these products of combustion from the combustion chamber into lateral flues or intermediate chambers and then by a circuitous course into the baking chamber, through its lateral walls, he opened a series of flues through the crown of his furnace into the baking chamber thus throwing the full volume of burning gases directly into this chamber beneath the suspended bread so that its whole efficiency is exerted, and in the most advantageous way, before it passes to the escape flue. Instead of carrying the draught out at the top during the baking, as in the Ball oven he provides, in addition to the escape flue at the top which is only for temporary use, a flue at the bottom of the baking chamber which is during the process of baking the only egress for the draught and such of the products of combustion as it carries with it.

The flue at the top is used only in starting the furnace.

When the fire is well under way, and the baking is to commence, that flue is closed by a damper. The baking chamber is thus made to answer also the purpose of a combustion chamber, the inflamed gases being temporarily confined above the furnace where they are subjected to its intense heat, and where they receive a large additional supply of oxygen from the vapors given off by the dough. The process of combustion is much more perfectly completed than if they were carried at once into the draught chimney, or otherwise sheltered from the blaze.

The construction of the oven and its relations to the furnace cause the effective products of combustion to be retained in the baking chamber until they have done their work. The heavier products of combustion sweep over the floor of the oven and out through the bottom flue, contributing, so far as they are capable, to the heating of the oven while passing under the bread.

The distinguishing features of the McKenzie organization are the baking chambers placed directly above the furnaces, and serving as their combustion chamber and as a temporary reservoir for the heated gases while doing their work, with its upper flue for starting combustion, and its bottom flue for use during the baking; the furnaces placed under the floor of the baking chamber and having their crown open through that floor so as to throw the entire volume of the products of combustion into and through the baking chamber before they are passed to the exit flue; and the revolving reel arranged in the baking chamber directly above the furnaces and in line with the ascending gases but out of line with the draft.

The invention is thus summed up in the first claim of the patent:

> "The combination of the following elements, to wit: A furnace or fire-place (one or more), a baking chamber arranged above such chamber or fire-place, and in direct communication therewith, and a rotating reel located within said baking chamber, and provided with gravitating pans or shelves, arranged or hung around the shaft of said reel from rods attached to the end plates or arms thereof, substantially as and for the purpose described."

That the invention was not a trivial or fanciful one is sufficiently shown by the fact that the same amount of space, labor, and fuel accomplished in the McKenzie oven nearly seven times what they had in the tile ovens, and twice what they did in the Ball with such improvements as had been added between the date of the Ball and McKenzie patents, while the quality, as regards thoroughness and uniformity of baking, was greatly improved; and by the further fact that the McKenzie oven soon drove all competitors from the market, though at first universally denounced as impracticable, and that the owners of Ball ovens were compelled to have them rebuilt on the McKenzie plan.

See *Dep. Wilson*, pp. 48, 49, and *Dep. McKenzie*, pp. 25, 26.

The evidence shows that until the actual success of the McKenzie oven was demonstrated by practical tests by McKenzie his plan was considered too absurd to warrant an experiment.

See *Dep. McKenzie*, pp. 24, 25.

INFRINGEMENT.

The defendants' oven is shown in evidence by the drawing, "Complainant's Exhibit F. M. No. 1," opposite p. 98 Rec.

It is thus described by Millward, *in Rec.*, p. 40, ans. 5:

"*A.* I examined these ovens yesterday. The drawing I now mark F. M. No. 1 represents substantially correct the largest of the two reel ovens used in the bakery, and the only difference between this oven and the smaller one is, the size and number of pans on the reel. The one shown in the drawing being a twelve-pan reel, and the other having but eight pans. The construction of these two ovens is substantially as follows: A large reel is fitted to revolve within an arch-top oven or baking chamber, a number of bread trays being suspended at each end of the reel, as shown in the drawing. At the bottom of the oven two furnaces or fire flues are arranged, the operation of which submits the bread trays to the application of heat, which is not only direct in the sense of being applied in the actual contact of the gaseous products of the furnace to the pans, but is also

> direct in the line of communication, by which it is enabled to reach the pans. The furnace having no inclosed cover, and no provision of side delivery of the gases to the bread chamber. The bread chamber in each of these reel ovens is supplied with two flues—one communicating with the top of the chamber and the other with two apertures in the bottom thereof, as shown in the drawing—both flues being governed by dampers to permit the escape of smoke, etc., during the operation of lighting up, and the regulation of the temperature, during the operation of baking."

It will be seen that this follows exactly, so far as all the leading features are concerned, the McKenzie plan of construction, and retains the combination originating with Ball and covered by the Ball patent.

The baking chamber arranged above the furnace, between it and the escape flue; the swinging bread-holders suspended from the arms of a rotating reel within this baking chamber; the furnace beneath communicating with this baking chamber so as to bring the products of combustion into direct contact with the bread and allow it to circulate about it in the baking chamber as the bread is carried around this chamber; all are found combined for the same purpose as in the Ball and so as to obtain all the advantages that distinguish it.

But it was from the McKenzie oven that the plan of the defendants was directly taken, and to this it adhered with an exactitude that shows a thorough recognition of its merits and an unwillingness, or want of capacity, to venture upon any departure in principle, structure, or mode of operation.

The baking chamber is, as in the McKenzie, placed immediately above the furnaces, serving as their combustion chamber and as a temporary reservoir for the circulation of the heated gases. This chamber has the upper flue for starting combustion and the bottom flue as the only exit for the products of combustion during the baking. The furnace, as in the McKenzie, is constructed beneath the floor of the baking chamber in the front part of the oven and opens through its crown into the baking chamber, throwing the entire volume of the products of combustion

into and through the baking chamber before they can pass to the exit flue. The revolving reel is constructed and arranged precisely as in the McKenzie, directly above the furnaces, in line with the ascending gases, but out of line with the draught. The baking bread is in each case exposed upon the suspended shelves of the revolving reel, in a chamber arranged over the furnaces and intermediate between them and the exit flue. The full volume of heated gases and products of combustion is thrown into the baking chamber through the top of the furnace and directly beneath the revolving reel. The heated gases which rise from the flame are confined in the baking chamber until they descend again to the floor having done all the work they are capable of. The heavier products of combustion, while being carried through the baking chamber and forced to pass over its floor and under the bread, are diverted from actual contact with the bread, and their deleterious effects avoided while their heat is utilized.

The baking chamber, by temporarily confining the products of combustion above the flame as they rise from it, insures their more perfect combustion in this chamber where it will be most effective. The reel, with its capacity for thoroughly and uniformly exposing the bread in all parts of the oven, and within the least possible distance from the furnace, and with the most perfect access of the rising current of hot gases, also enables the bread to be introduced and removed with such rapidity as to obtain the advantage in maintaining combustion which McKenzie found to result from the contact of the moist bread with the incandescent gases. The construction of the oven with the exit flue at its bottom prevents any draught or current through the bread, and insures a substantial uniformity of heat in all parts of the baking chamber through which the bread is carried.

The only difference which distinguishes either element of the defendants' combination, either in construction or arrangement, from those shown in the McKenzie patent, is that, instead of a series of small flues or apertures through the floor of the oven, as shown in the drawing of that pat-

ent, the defendants' form one aperture or flue coextensive with the top of each furnace. This change does not eliminate from the organization either of its factors, or change the office of either. It does not deprive it of a single step in its operation, or substitute any different kind of agent for any step. It is purely nominal. The function of the flue is in no way changed by extending the several small flues into one large one.

> "In determining about similarities and differences, courts of justice are not governed merely by the names of things, but they look at the machines and their devices in the light of what they do, or what office or function they perform, and how they perform it, and find that a thing is substantially the same as another if it performs substantially the same function or office in substantially the same way to obtain substantially the same result; and that devices are substantially different when they perform different duties in a substantially different way, or produce substantially a different result."
>
> *Bates* v. *Coe*, 18 Otto, 31 (42).

The McKenzie patent is not limited to any specified size or number of communications between the furnace and bake chamber, but only requires them to be such that the heated gases may rise directly into the chamber through its bottom. The original McKenzie patent, which is in evidence, expressly states that "the flues are sufficiently numerous to conduct off the heat very rapidly from the furnace, and diffuse it through the oven," and that "these short flues are the only means of escape for the heat from the furnace except what little will be absorbed and given out by radiation from the brick-work above the arch into the oven." Both these statements are repeated in the reissue here in suit. The similarity of construction and operation of the two machines is illustrated by the drawings opposite.

The defendants' arrangement embodies, both in form and in effect, every feature of the description.

If the defendants' flue can be distinguished at all from the McKenzie it is only by an increase in size, producing no difference in kind or effect.

If held to embody any additional invention, it can, at most, only be considered as a subordinate modification.

Upon the question of infringement, Millward testifies as follows (see *Rec.*, *p.* 40, *ans.* 6):

"*A.* I am clearly of the opinion that each of the ovens to which I have referred as being in the bakery of Dozier, Weyl & Co., and of which Exhibit 'F. M. No. 1' is a substantially correct representation, does contain the particular improvement, specified and shown in the 'Ball reissue' and set forth in the first claim thereof, and each also contains in my opinion the particular improvement in bake ovens shown and described in the 'McKenzie reissue' and summed up in the first claim thereof, for the following reasons, and under the following understanding of the patents referred to. In the 'Ball reissue' a bake oven is shown and described, in which a reel carrying at the ends bread trays suspended from the end plates thereof, the reel revolving within a bread chamber arranged over the top of a furnace, the top of the furnace being impervious to the products of combustion, the gases passing out of the furnace sideways into side passages around the bread chamber, the walls of the bread chamber having side apertures to permit the currents of heated gases to pass sideways into the bread chamber, for the purpose of enabling said gaseous products to come into direct contact with the bread in the oven; in other words, the products of combustion are enabled to pass into or through the bread chamber within which the bread holders move, in contradistinction to bake ovens in which the bread is baked by the radiation of heat from the walls of the bread chamber, which is heated exteriorly by the furnace. I understand therefore that in the operation of this Ball oven, that while the communication between the furnace and the bread chamber is shown in the patent as indirect, the application of the heat of the gaseous products to the pans is direct, with all the accompanying advantages of circulation, actual contact with the bread, etc.; and I understand furthermore that the improvements specified in the first claim of the Ball reissue would include all ovens in which the pans of the reel described therein had such communications with the furnace that the pans were subjected to direct contact with the products of combustion, whether they reached the bread chamber by a circuitous route or a direct one, although the patent does not describe any but the circuitous one and does not suggest any way of accomplishing the direct communication, the essence of the operation being that 'the products

of combustion will pass into or through the chamber.' With this explanation of my understanding of the Ball re-issue, as to the improvements specified in the first claim, I repeat my opinion that the ovens shown in 'F. M. No. 1' contain the improvements specified in the following words, in the Ball reissue: 'Claim 1. One or more swinging bread holders suspended from the arms or end plates of a rotating reel in combination with a furnace, so arranged and connected that the products of combustion will pass into or through the chamber, within which the bread holders move.' With reference to the bake-oven shown in the McKenzie reissue, it may be described as having the same kind of a reel and bread trays revolving within a bread chamber made differently from that shown in the Ball reissue and operating in conjunction with a furnace communicating differently with the bread chamber than is shown in the Ball reissue. The bread chamber as shown in the McKenzie reissue is not formed with double walls like the Ball oven, for the gases to surround the inner wall, but is simply a solid shell, having no application of heat at the sides, but receiving its heat and gaseous currents directly from the fire, and the furnace is not like the Ball, adapted to deliver the gaseous products to side chambers, and from thence into the bread chamber, but the furnace in the McKenzie delivers all its gaseous products directly into the bread chamber, so that while the McKenzie embraces obviously the direct application of heat to the bread which is specified in the first claim of the Ball reissue, the McKenzie reissue specifies one important improvement in respect to the means of communication between the furnace and bread chamber for the passage of the gaseous products from the furnace to the bread chamber, these products, as I before stated, passing upwards directly from the furnace to the bread chamber.

The oven shown in the drawing 'F. M. No. 1,' is one having a reel answering fully to the description of the reel shown in the McKenzie patent, and it has also a single casing bread chamber like the McKenzie, and furnaces having a direct communication with the bread chamber and trays like the McKenzie, the only difference being that the heat and gaseous products pass upwards in the McKenzie through apertures in top or crown of the furnace, while in defendants' oven, the crown is entirely removed so as to enable them to pass upwards more freely; with this explanation, I am of the opinion, as before stated, that the ovens shown by Exhibit 'F. M. No. 1,' embrace the improvement specified in the following language of the McKenzie reissue:

'Claim 1: The combination of the following elements,

> to-wit: A furnace or fire place (one or more), a baking chamber arranged above such furnace or fire place and in direct communication therewith, and a rotating reel located within said baking chamber, and provided with gravitating pans or shells, arranged or hung around the shaft of said reel from rods attached to the end plates or arms thereof, substantially and as and for the purpose described.' "

The plan of the McKenzie oven is so closely followed in the defendants' that extrinsic evidence is hardly necessary to show that it was actually copied from it. Such evidence, however, confirms the presumption of a direct and intentional appropriation of McKenzie's invention and shows that the similarity is not accidental.

It appears that Hall, who designed and built the defendants' oven, had been for some time before in the employ of McKenzie, as his agent for the construction of his oven; that while thus engaged he learned its value and popularity, and conceived the idea of making the slight formal changes which appear in the defendants' oven, and immediately went to building these ovens on his own behalf, and as a competitor with the employer from whom he learned the principles of their construction. See *dep. Hall, page* 61, *ans.* 2; *page* 63, *ans.* 25; *page* 64, *ans.* 4 *and* 5. *Dep. McKenzie, page* 29, *ans.* 31.

While he was building with McKenzie they constructed an oven in which the flues extended over the entire width of the furnace, and it seems then to have occurred to him that by following out that mode of construction he could share the harvest which was being gathered by his employer, and he accordingly left his employ to go into competition with him. See *dep. McKenzie, ans.* 31, *page* 29.

ANTICIPATION.

No evidence has been offered tending to show any use of any kind prior to the Ball patent. Several patents have been introduced which have already been referred to under the head of "State of Art Prior to Ball Patent."

The defendants' expert does not pretend to find in any of these patents the invention claimed by either Ball or McKenzie. The defendants' attorneys do not venture to

ask him whether any of the prior patents show the same machine or the same combination.

They simply ask him to look through them all, and see whether from them all he can pick out individually the "mechanical features" made use of in the Ball and McKenzie organizations.

On cross-examination he is asked (*page* 83.):

> "*Cross-Q.* 41. Do you find, previous to the original Ball patent, any bake oven that contains all the features recited in the first claim in the reissue sued upon?
> *A.* I do not.
> *Cross-Q.* 42. Do you find, previous to the date of the original McKenzie patent, any bake oven which contains all the features recited in the first claim of the McKenzie reissue sued upon?
> *A.* I do not."

An examination of these prior patents forcibly illustrates the amount of ingenuity that had for many years been expended in endeavors to reach what Ball and McKenzie accomplished, and the crudeness and inadequateness of the results. It shows how the skill and industry of a multitude of ingenious men was baffled by the problem which we are now asked to pronounce too simple and obvious for invention.

It shows most significantly the difference between the wisdom which comes after the fact, and the perplexity which goes before it.

Sellique and Vicar's Patents.

The Sellique and Vicar's patents, the first French and the other English, show that in both countries the advantages of obtaining the direct contact of the gases from the flames were realized and sought after, but the best method they could contrive for accomplishing this was to carry the current of gases, with all the smoke, soot, ashes, and other impurities, over the top of the bread arranged in a single plane on the bottom of what answered as the oven and was a mere flue for the continuous passage of this current and not in any sense a chamber for the circulation of the gases.

Smith Patent.

The Smith patent, also English, shows a further effort in the same direction, and following out the same plan, as the Vicars and Sellique. Like them it carried the current of heated gases in their course to the chimney over the surface of the bread arranged in a single plane on the bottom of the continuous flue which served as the baking chamber. It only added a horizontal carrier which conveyed the bread along the bottom of this flue from front to rear. It had no baking chamber, corresponding to either the Ball or McKenzie, in which the products of combustion are retained and allowed to circulate about the bread. It had no reel, and nothing which could perform the office of a reel. It had no chamber in which a reel could possibly be used. The theory upon which it, and all which hitherto endeavored to employ the direct contact of burning gases, proceeded—that of sweeping the continuous current from the flame in its course to the chimney over the bread, and in the direction of the plane in which the bread was arranged—necessarily excluded the use of the reel. Until an entirely different theory of construction was adopted, the introduction of the reel was impossible.

The Smith patent would have led the mind from, rather than toward, such an organization as the Ball.

From the McKenzie it is still further removed. Having neither the reel nor the circulating chamber it carefully guards against the other feature upon which McKenzie lays stress, that of carrying the products of combustion directly through the floor of the baking chamber so that they will operate upon the bread above in their ascending course from the flame. It provides expressly that the furnace shall be entirely covered. It does not and can not, as in the McKenzie, utilize the heat from the products of combustion without the contact of soot, ashes, and smoke, and all else that passes from the the fire to the chimney.

It has no baking chamber in which the lighter products of combustion are arrested until their heat is sub-

stantially exhausted and caused to circulate in contact with the bread out of the line of draught.

The current of heated gases would necessarily be along the sides and top of the continuous flue which serves as an oven. But a small portion would ever come in contact with the bread, and that would be mainly at the sides and top. With this "railroad oven" there is no interchange of the relative position of the bread as with the reel, so as to secure a uniform baking of all. That which is placed in the middle where it is sheltered from the current of heated gases remains so sheltered in its entire course, while that which is placed at the side remains exposed throughout to the heated currents which sweep along the edges.

This patent is so far from containing either the Ball or McKenzie combination, that it is difficuct with them all before us to see how they could have obtained even a suggestion, other than a warning, from it.

Carrot and Covelet Patents.

The Carrot and Covelet patents, both French, show that many years before the Vicars and Smith patents the reel was known as a means of suspending bread in a close oven, where the baking was effected by raising the temperature of the body of air confined within the oven by radiation through the walls of the oven, and where no circulation through the oven and no substantial variation in temperature between the different parts of the oven was possible. The reel being unfitted for use where the object was to expose the bread as much as possible in the line of draught, and this being the only means known for obtaining the contact of the gases of combustion with the bread, it was assumed to be necessary to exclude from the ovens in which it was used all draughts, and to dispense with the advantages of this contact. Accordingly both Carrot and Covelet carefully excluded these gases from the ovens in which the reel was used. So careful is Carrot to guard against bringing the gases of combustion into the baking chamber, that the only egress which he provides for the "emanations within" is through the hollow shaft which

supports the oven, in such a way as would effectually prevent the slightest particle of gases from entering.

Neither Carrot nor Covelet shows or suggests any organization that contains, or admits of, the combination claimed by either Ball or McKenzie.

Neither Ball nor McKenzie makes any claim to the reel except as one element of his organization.

Not only is it beyond dispute that such a combination had never been organized before, but it is equally indisputable that no baking chamber into which the products of combustion were carried had ever been constructed upon any plan that would admit of the combination of the reel with it, and it was only by turning resolutely from all the plans of construction which preceded him and making an entirely new organization throughout that Ball demonstrated the practicability and utility of bringing the gases of combustion and reel together in a single chamber in which these gases were caused to circulate beneath and around the bread suspended upon the trays of the reel while it also revolved through them, thus exposing all the bread successively to the different degrees of heat in different parts of the oven incident to the introduction of the gases of combustion and which had been the great difficulty in the way of the direct use of these gases.

He made these elements, by their conjoint action, overcome the very difficulties which had hitherto stood in the way of their combination, as well as the difficulties which had stood in the way of any successful direct application of the products of combustion to the baking bread.

The revolutions of the reel carrying the bread through different planes, both vertical and horizontal, overcame the danger of unequal baking due to the tendency of the gases in their flight through the oven to seek certain courses, an objection which seems up to this time to have prevented any satisfactory application of these gases. It also, by suspending the bread in the line of ascent, exposed the bread across the path of the gases, instead of in a plane parallel to their course as had been the case in all preceding ovens. This method of exposure would not only secure

the contact of a much larger proportion of these gases and in a much more effective way than when they were drawn across the surface of the bread, but would materially lessen the liability of the bread to any deposit of soot, smoke, or ashes, and to surface scorching.

The chamber in which the flight of the gases was temporarily checked, and their retardation and circulation insured, overcame, in its turn, the difficulty which had hitherto precluded the combination of the reel with any oven through which the gases of combustion were carried, the necessity, which had existed in them all, of exposing the bread in a single plane in line with the current of draughts.

These are all the prior devices, which have been referred to by defendants' expert as touching upon the Ball patent.

Jennison Patent.

There is one other later than Ball and shortly before the date of McKenzie—that to Jennison, February 1, 1859.

McKenzie carries his invention considerably behind the date of this patent.

See—

Dep. McKenzie, Rec. p. 26, *Ans.* 4, *et seq.*

Dep. Osmon, p. 55.

Dep. Fithian, p. 54.

Dep. Anderson, p. 51.

The Jennison patent does not show a reel oven, nor any oven so constructed as to be capable of practical combination with a reel, nor any method of exposing the bread by which the successive trays intercept different currents and deflect them about the baking chamber.

It does not show any baking chamber arranged above a furnace in such manner that the products of combustion are passed into and through it before they can reach the exit flue.

It does not show any baking chamber intermediate between the furnace and its draft flue.

The oven is simply a long vertical flue, or, as he terms

it in his patent, "a long hollow shaft," in which the bread is suspended in a series of pans, arranged one directly above another.

There is no separate furnace, but a fire is built on the bottom of this hollow shaft, and a chimney placed directly over the fire takes the draught from it with all the products of combustion which are carried with the draught. In the absence of furnace, or fire-box to confine the fire, the flames are swept directly up the chimney, and all the advantage which McKenzie obtains from his separate furnace and from so arranging it as to cause the entire products of combustion to rise directly into his baking chamber and pass over its floor, making that serve as a combustion chamber intermediate between the furnace and discharge flue, is lost, and with it probably two-thirds of the effective heat which he utilizes. There is a communication between the top of the hollow shaft and the chimney, but this is provided simply for the purpose of cooling the oven. It not only is not designed for use as a draught flue, but could not be put to that use without carrying the current of draught, with all its impurities through the bread, one of the evils which the McKenzie combination especially avoids.

The absence of the reel, one of the elements of the McKenzie combination, from the Jennison patent, is sufficient to show that it is not the same organization; and this is especially true when the structure of the other elements is such as to exclude its introduction.

The endless chain used in the Jennison patent to suspend the bread has neither the mechanical features, nor the advantages of the mode of suspending the bread, specifically recited in the claim of the McKenzie patent. However it might answer where some other mode of heating is used, it is not the equivalent of the reel for exposing the bread to the ascending gases from combustion.

The reel exposes each tray at all times in a different vertical plane from those which succeed and follow it, and in a vertical plane that is always changing. It thus causes every tray to be at all times exposed to the vertical action of the ascending gases. It makes the trays the means of

deflecting the currents of these gases, so that they circulate beneath, around, and between all the trays in every part of their course, sweeping aside, at the same time, the vapor rising from the bread, preventing it from accumulating on the bottom of the tray above and so cooling that tray, and, by bringing it into direct exposure to the intense heat from the flames, insuring its decomposition. It also causes each tray to constantly change its vertical plane, so as to successively intercept all the currents of heat or gases and avail itself of their different degrees of intensity.

The Jennison endless chain possesses neither of these functions. It suspends the bread in two vertical planes, and moves it in those planes. Each tray serves as a shield, completely intercepting the ascending gases of combustion from that above it. The moisture evolved from the baking dough in each pan rises against the pan above it, completely enveloping it, and thus serves as a kind of blanket to exclude the heat from it and impede the operation of baking, while also tending to make the bread sodden. This effect is transmitted through the entire series. The bread is thus arranged in a column of comparatively cool, moist, air, while all except the few lower pans are effectually shielded from the flames. This column presents a solid barrier to the hot gases in the line of their ascent, while to either side of it they have a direct and uninterrupted course. This direct and uninterrupted course they would inevitably take, to the exclusion of that in which the bread is arranged. From this course there is nothing to divert them.

The bottom pans alone are exposed to the blast of heat, and this at a time when they are brought into close proximity to the fire.

A heat sufficient to even warm the long column of moist dough extending in a direct line from the flame would be sufficient to scorch in a moment the two lower pans when suddenly exposed just above the blaze. A heat that would properly bake the dough upon these two lower pans would hardly affect the pans far up in the column.

The Jennison patent was before defendants' expert,

and had just been referred to by him, when he admitted that no patent prior to McKenzie's contained the features of McKenzie's first claim. See Cross-Q. 42, p. 93.

See also *Dep. Millward*, Ans. 11, p. 59.

The arrangement of the Jennison oven is obviously impracticable for an oven designed to compete in the modern market. The substantial difference between it and the McKenzie oven is sufficiently shown by the difference in practical results.

The evidence shows one Jennison oven to have been built. This was used at intervals for baking in small quantities for a short time; the man who used it thinks a year and a half or two years. The most it ever baked was seven barrels in a day. The oven was then abandoned by the man who owned it, who substituted for it the old-fashioned brick oven with no mechanical movement whatever and has continued to use these old-fashioned ovens in the same town where he had tried the Jennison, from that time to this, sixteen or seventeen years. He has never seen another Jennison oven. This is in most striking contrast to the McKenzie which did at once more than six times the work of the old tile oven of the same size, with the same fuel and labor.

See *Dep. Byrns*, pp. 87, 88, 89.

The extent to which the McKenzie oven has gone into use is shown by the deposition of Wilson, Ans. 4, p. 49:

> "*Q.* 4. So far as you are acquainted with the art, are any of those ovens in use prior to the McKenzie oven now built, or have they within the last few years been built in what are considered first-class baking establishments?
>
> *A.* As far as I have any knowledge from personal observation or from information derived from other bakers, the use of any oven but the McKenzie reel oven is unknown."

The same witness, one of the best authorities in the country upon this subject, testifies as follows in reference to the advantages secured by the McKenzie oven (Ans. 2, p. 49), first comparing it with the Ball oven, and next with the old tile oven:

"After Mr. McKenzie had changed the furnaces and flues of the four ovens so they conformed to his patent arrangement, the baking capacity of the ovens was increased 100 per cent.; that is to say, from being able to bake only 40 barrels of flour in 10 hours, we were enabled, by McKenzie's process of heating, to bake 80 barrels of flour in 10 hours. The quality of the biscuits baked as regards thoroughness of baking and uniformity, was also greatly enhanced. We were so much pleased with this result that we had a fifth oven built immediately according to Mr. McKenzie's own plan of construction throughout, and it gave us great satisfaction, and we have continued to use it to the present time. It will bake 100 barrels of flour in 10 hours into biscuits such as are used by the U. S. Army.

It occupies a space of 18 feet in depth, by 12 feet in width, and is about 20 feet high.

Q. 3. Please state how the McKenzie ovens, now in use by you, compare in quality and quantity of work with the ovens in use prior to 1856, and also with those in use before this McKenzie oven was introduced.

A. The McKenzie oven effects a great economy in labor, in fuel, and in space, as compared with the tile ovens which were in use prior to the mechanical ovens. In labor the saving is very great; four men were required to fill and empty two tile ovens, the maximum capacity of which was 12 barrels of flour each in 10 hours. The fuel required to heat those two ovens was about ½ ton of coal, the space they occupied was 25 x 20 feet, and about 12 feet in height. Two of the McKenzie ovens, each capable of baking 80 barrels of flour in 10 hours, would occupy the same space necessary for the two tile ovens. Four men would empty and fill those two McKenzie ovens in 10 hours, and the result of their labor would be 160 barrels of flour baked; and the fuel required to bake these 160 barrels of flour would be 1 ton of coal, anthracite, the same as used in tile ovens. The parties who have used the original oven put up by Ball on Front street, known as the Novelty oven, and also those who have used the Treadwell wire belt oven, and the Bordan oven, have long since abandoned their use and are now using the McKenzie oven, giving it the preference on the score of economy and the uniform good quality of the crackers baked in it."

Bright testifies upon the same subject as follows (p. 35):

"*Q.* 8. How have you found, in your experience, that the McKenzie oven of which you speak, compares with

other ovens with which you have been acquainted in respect to the quantity which it bakes in a given length of time?

A. I find them far superior to any oven that I have worked, or seen worked.

Q. 9. How have you found this oven to compare with others in respect to the quality of work done?

A. The work in the McKenzie oven is more uniform bake than any other oven I have ever worked at, or seen work.

Q. 10. Have you observed any advantage or disadvantage, resulting from the introduction into the baking oven of the heated gases from the fire, instead of heat exclusively radiated from the brick or iron work of the oven? If so, state what such advantage or disadvantage is.

(Objected to by defendants' counsel.)

A. I do find a great deal of advantage from a direct heat; the reason is this, in my experience, that you can't keep an oven in good heat unless you have the direct heat from the fire, and the heat uniform from the bottom of the oven. Any bread, or crackers, or cakes, require the most heat from the bottom; no matter how hot an oven is, bread, crackers, or cakes will not be as light without the bottom heat, and will not look or taste as well, unless they get their principal heat from the bottom.

Q. 11. What difference, if any, does it make in the quantity baked in a given time, whether the heat is applied at the bottom or at the sides and top?

A. To my knowledge, it will make from forty to fifty per cent. difference in a day's work.

Q. 12. Do you mean that when the heat is applied at the sides and top there will be a greater or less quantity baked than when applied at the bottom?

A. That is what I mean by forty or fifty per cent less.

Q. 13. Have you found, from your experience, that it makes any difference whether the heated gases come directly into the baking oven from the fire, or the heat only reaches the oven by radiation through the walls of the oven? If so, what is the difference?

(Objected to, because it does not appear that the witness has had the necessary experience to enable him to answer.)

A. As to my experience and judgment as a baker, I have never seen an oven that can be kept agoing all day—at work all day—that's what I meant, and turn out as much work without the direct heat; they will either get too cold or not bake the bread or crackers uniform.

Q. 14. Does it make any difference in the quality of the bread or crackers turned out whether the heated gases pass through an open space from the flame to the ma-

terial to be baked or the heat only reaches such material by radiation from the walls of the oven?

(Last objection repeated.)

A. My experience about that is this: I find the goods bake lighter and more equal, and a better flavor than any thing else—than baked in anything else, than baked in any other oven. It does make a difference. They bake quicker and lighter.

Q. 15. Have you ever used ovens in which the heat only reaches the material to be baked by radiation from the walls of the oven?

A. I have not, but I have seen them at work. I never seen the goods baked well or uniform.

Q. 16. How does the heat enter the ovens which you have been using at the Garneau bakery, and to which you refer as the McKenzie oven?

A. The heat enters through what we call pigeon-holes, from the side and top of the fire arch.

Q. 17. How is the oven located with reference to the fire arch?

A. The fire arch is on the bottom. The oven is over it.

Q. 18. How large a quantity of hard bread or crackers can be baked in one of these McKenzie ovens in a day?

A. There can be a hundred barrels of flour baked into bread in a day; I have baked a hundred and ten already in eleven hours.

Q. 19. How many barrels of hard bread will a hundred barrels of flour make?

A. From two hundred and fifty to two hundred and seventy-five—some flour will turn out more and other less.

Q. 20. How large a quantity did you ever bake in the same length of time in any other oven that you have used?

A. I never baked more than seven barrels of flour in any other oven that I have used."

The difference in the results accomplished by the two ovens conclusively shows that the difference in structure is a radical and essential one.

The difference between them is the difference between practical success and practical failure.

A prior machine, to anticipate a patent, must have the same elements similarly combined, and doing the same work.

The Jennison patent does not show the same elements as are recited in the claim of the McKenzie patent. It does not show elements similarly combined, and it does not show a machine capable of doing the work of the McKenzie.

Either of these facts is sufficient to show that it does not embody the McKenzie invention.

A material difference in utility, due not to greater perfection of finish, but to difference in structure and elements—differences which involve contrivance and plan—is, of itself, proof of patentable novelty.

Patent for organized machine only anticipated by showing same organization.

The rule that a patent for an organized machine can only be anticipated by showing the complete organization in some one earlier device or publication, and that it is not sufficient that, with the patent before us, we can see where out of various prior machines the inventor might have obtained suggestions or selected some of the elements which he adapted to the purposes of his organization, is too well established by authority, and too obvious in itself, to require discussion.

See *Imhauser* v. *Buerk*, 17 O. G. 795 (Supreme Court.)

Parks v. *Booth* (Supreme Court), 17 O. G. 1087 (101 Otto, probably.)

Bates v. *Coe*, 8 Otto, 31.

Not one prior patent shows an organization similar to that of either of complainant's patents.

Not one shows the combination of elements upon which the claim of either patent is based.

Not one shows a combination of equivalent elements.

Not one shows any provision for the exposure of the bread, to the heated gases, in such a manner as to secure their free circulation about it.

Not one, prior to Ball, shows any provision by which the heated gases from the flame can be retained in contact with the bread.

Not one shows the Ball or McKenzie reel for introducing and exposing the dough to the heated gases.

Not one shows an oven in which such a reel could be introduced or used for that purpose. All these patents,

together, do not show the several elements of either the Ball or McKenzie, of such construction as to be capable of combined use.

All which show any method of bringing the heated gases into contact with the dough show them only carried through by the draught of the furnace, sweeping rapidly over the surface of the bread in their course through the oven, in such a manner as to endanger its scorching on top, and necessarily carrying the soot and smoke into contact with the bread.

All proceeded upon the theory that the only way in which the products of combustion could be brought in contact with the baking bread was as a current carried with the draught toward the escape flue, and that combustion could only be supported by, and its products carried in the direction of, such draught.

McKenzie discovered that, if the bread was introduced and returned in sufficiently rapid succession, it created a sufficient draught to support the combustion, and dispensed with the necessity for the ordinary draught chimney during the operation of baking.

He was thus enabled to confine the heated gases in contact with the bread until they were completely utilized.

See p. 23, *Rec.*

The theory upon which all these ovens shown in the prior patents were constructed precluded the retention of the heated gases in the baking chamber, and also precluded the introduction and use of the reel. They were necessarily constructed of such a shape as to render the combination of a reel with them utterly impracticable.

Such a combination could only be made possible by a radically different theory and mode of construction throughout.

See in this connection dep. Millward; ans. 12, 13, *p.* 60, *Rec.*

There is no evidence to show that any of the ovens shown in the prior patents ever went into use, except the Jennison which is shown to have been almost immediately abandoned for the old tile oven.

There is nothing to show that they were operative and practical devices except the patents themselves. The patents, except the Jennison, are all foreign patents, issued in the countries where no such examination into the merits of an invention is made, prior to issuing a patent, as is required in this country, and where the issue of a patent only shows that the patentee has paid the required government fees.

The evidence does show that none of the ovens exhibited in these patents are in use to-day, so far as is known to men most extensively acquainted with the art.

See dep. Wilson; ans. 2, 3, 4, *p.* 48–50, *Rec.*

The defendants while beseeching the Court to hold these by-gone experiments to embody the invention here in controversy, are illustrating by their conduct the insincerity of their argument. These old machines are all open to their use without controversy, and yet they will not touch one of them, while they wage a long and expensive warfare, with all the hazards attending it, for the sake of using the complainant's combination.

PATENTABILITY.

Failing to find any prior device which even their expert could say embodied the invention described and claimed in either of complainant's patents, the defendants fall back upon the allegation that there was no patentable invention involved in contriving or constructing them.

It can not be seriously contended that any of the prior patents exhibit or suggest a structure containing either the Ball or McKenzie combination, or even that in them all collectively can be found the several elements capable of being united to form either of these combinations without fundamental changes in their individual structure.

But, as usual in such cases, we are carried over the prior art, and asked to see, in the light of the invention, how the inventor might have selected out of one abortive or abandoned device a feature capable—with some changes easy enough to suggest—of being made to do duty as one element of his organization; how, in another, he might

have obtained a suggestion as to the value of a second element; and how slight a modification of something found in another would have supplied him with a third element. We are then shown how easy is the mechanical problem of adapting these elements to co-operate in a single organization, and asked to conclude that this organization, before which all these crude devices of the past vanish like the mist before the sun, involved no invention.

The combination of the several elements may seem to involve no great mechanical difficulty when we have the plan before us, but the plan is the soul of the invention, and he who formulated, developed, and embodied it has done all that is necessary to constitute him an inventor.

The patentability of an invention does not depend upon the ease or difficulty with which its mechanical embodiment is attended. Even with the selection of elements made, and the desirability of combining them determined, the problem of how they should be adapted to each other, and made to co-operate in the most effective manner, was no insignificant one, and required contrivance, ingenuity, and experiment for its successful solution.

The method of its solution seems to have been a surprise to the inventor himself, and its practicability incredible to those engaged in the art until he demonstrated it by actual work.

No speculation after the event can weigh against the significant fact that, while inventors were striving after what should accomplish just what the patentee's machines accomplished, and while bakers stood ready to embrace any improvement which would increase their production or lessen their expense, the inventors had produced, and bakers were using, nothing better than the old-fashioned tile oven, which, with the same space, labor, fuel, and time, would do less than one-sixth the work of the McKenzie, and not do that fraction as well.

Before this fact all theorizing about the obviousness of the combination fades into nothingness.

It can never be held, without utter disregard of both the spirit and letter of the patent law, that the man who,

either by a new combination or by any structural change, makes a machine produce two loaves of bread where it produced one before, has not made a patentable invention.

It is the improvement which comes as the result of plan and contrivance, which is obtained by change in method or structure, and not that which is due merely to perfection of mechanical finish, which the patent law protects, but it prescribes no test of occultness.

The distinction between that contrivance which constitutes invention and the improvement which is due to mere mechanical skill is best illustrated by observing the reason why the law protects one and not the other.

The improvement which comes through mere mechanical skill can only be imitated by the same skill. That which comes through contrivance can be appropriated without contrivance. One can not be stolen; the other can. The mechanical skill has to be independently acquired by each individual, and exercised in each production. It needs no law to protect it, for it is a protection unto itself.

The change in method of construction when once contrived has never to be contrived again, and, but for the intervention of the law, may be adopted without effort by those who are incapable of its contrivance.

The simplicity of the contrivance, as judged after the the fact, does not exclude it from protection.

An invention often seems simple and obvious in proportion as we recognize its perfect adaptation to the work it has to do, as an argument seems simple when it presents its conclusions so naturally and clearly that the listener feels there is no room for argument.

It is the part of ignorance and not of wisdom to deny that there is logic beneath such an argument, or genius beneath such an invention.

It is such arguments which carry conviction, while those which abound in syllogism only carry a reputation for profundity; and it is such inventions that push forward the useful arts, while those which astonish us by their ingenious complexity only serve as curiosities on the shelves of the museums.

Superior utility evidence of invention.

The superior utility of one structure over another imports a substantial difference in organization, and consequent patentable invention.

The law is thus stated in Webster on Patents, under "Subject-matter," p. 30:

> "The utility, then, of the change, as ascertained by its consequences, is the real practical test of the sufficiency of an invention; and, since the one can not exist without the other, the existence of one may be presumed on proof of the existence of the other. Whenever, then, utility is proved to exist in a very great degree, a sufficiency of invention to support a patent must be presumed. And the fact of one invention having come into use, to the exclusion of another of prior date, and apparently extremely similar, will lead to the presumption that there was some difference, and a sufficient difference to support a patent—the one invention having failed, the other having come into use.
>
> The following important practical conclusion may be derived from the preceding, namely, that the sufficiency of an invention can not be judged of or ascertained by the apparent amount of thought, design, or skill which may or may not have been exercised in producing it. In many cases, as those in which the invention consists in the application of some known substance or thing, the result can exhibit no trace of the thought, design, or labor expended, however great it may have been; and in those cases in which the result itself may exhibit traces of that thought and design, as in some complicated piece of machinery or elaborate composition of matter, that result may turn out to be useless, and so the invention, which is to all appearances most sufficient, may, in fact, be most insufficient."

This was cited and applied by the Supreme Court, in *Smith* v. *Goodyear Dental Vulcanite Co.*, 3 Otto, 486 (495).

See, to same effect—

Many v. *Sizer*, 1 Fish. 27.

Johnson v. *Root*, 1 Fish. 362.

Judson v. *Cope*, 1 Fish. 624.

Carter v. *Baker*, 4 Fish. 404–418.

Penn. Salt Manufacturiog Co. v. *Thomas*, 5 Fish. 148–151, 152.

Smith v. *O'Connor*, 6 Fish. 469–473.
Smith v. *Woodruff*, 6 Fish. 476–479.
The Stillwell & Bierce Manufacturing Co. v. *The Cincinnati Gas Light and Coke Co.*, 7 Off. Gaz. 839.

Consideration due repeated action of Patent Office on question of patentability.

The question of patentability has been repeatedly passed upon by the Patent Office, in the issue, reissue, and extension of each patent. The extension implies that they were found to contain more than the measure of invention necessary to bring them within the technical requirements of patentability.

The attack upon the novelty and patentability of complainant's invention is based only upon what was before the Patent Office when the patents were acted upon. All the evidence is from the files of the Patent Office in the same class. The patents show, upon their face, that they were granted for just what distinguishes them from these earlier patents.

The case is quite different from that where the attack rests upon evidence that was not passed upon by the office.

Upon the question of patentability, as affected by what is before it, the action of the office is entitle to great if not controlling weight.

This is the tribunal to which government has referred this question, and for the determination of which it is especially constituted and qualified. It is by its action upon this question, as the official voice of the government, that the public have to be guided. It is upon the faith of this that the present assignee has bought, at large outlay, the rights which he asks the Court to protect.

This is not one of the questions which the Court is especially authorized to pass upon by the statute.

It would seem that the common law rule as to the conclusiveness of the action of a commissioner upon questions within his jurisdiction would make the action of the Commissioner of Patents conclusive upon such questions

as he is authorized and required to act upon, except such as the courts are, by the terms of the statute, expressly authorized to inquire into. These are all questions dependant upon facts which are not necessarily before the Patent Office when it grants the patent.

See *Foley* v. *Harrison*, 15 How. 433 (448.)
Field v. *Seabury*, 19 How. 323 (332.)
Bartlett v. *Kane*, 16 How. 263 (272.)
Rubber Co. v. *Goodyear*, 9 Wall. 788 (798.)
Allen v. *Blunt*, 3 Story, 742.

In any event the special qualifications which the Office has for determining the question of patentability, and the extent to which the interests of the public must be based upon its authority, should cause the Court to respect its action so far as affected by what is before it, and only to disturb it, if at all, where there is no room for doubt.

Authorities on patentability.

The patentabilty of complainant's machine, as compared with all predecessors, can not be denied without denying each of the following propositions, which are well established by the authorities:

First. That the combination of two or more elements in such a manner that they are enabled to co-operate, and thus produce, or contribute towards, a common result, is invention within the meaning of the patent law.

Second. That a change in method by which either a result different in kind, or of increased effectiveness, is obtained is such invention.

Third. That even if the parts are all old, if they can be so united as to co-operate with each other towards a common result, such combination of them constitutes patentable invention; especially is this true if the several parts or elements require substantial modification in their construction to enable them to co-operate.

If when used in such combination the individual parts become more effective than in former combinations the invention may be of the highest order.

Fourth. That where the substitution for one element of a combination of another renders the remaining elements more effective in contributing to the common result sought by the combination this substitution is patentable invention. This is especially true, where the substitution involves a change in the construction of the other parts to adapt them to co-operation.

Fifth. That where the introduction of an old element into a new combination, enables that element to accomplish its work more effectively than in any combination in which it has been before used, its greater effectiveness being due to its relations with the elements with which it is for the first time brought in combination, this is patentable invention.

See—

Gould v. *Rees*, 15 Wall, 187.

Gilbert and Baker Manufacturing Co. v. *Terrell*, 8 O. G. 2.

Pearl v. *Ocean Mills*, Official Gazette, Jan. 2, 1877.

Also *Morton* v. *Middleton*, 1 Cr. S. 3d series, 718.

Foxwell v. *Bostock*, 12 W. R. 725.

Murray v. *Clayton*, 20 W. R. 650.

Allen v. *Rawson*, 1 C. B. 551.

Imhauser v. *Buerk*, 17 O. G. 795.

Parks v. *Booth*, 17 O. G. 1089.

In *Forbush* v. *Cook*, 20 Law Rep. 668, Justice Curtis says:

> "It is decisive evidence, though not the only evidence that a new mode of operation has been introduced, if the practical effect of the new combination is either a new effect or a materially better effect, or as good an effect more economically attained by means of the change made in the combination by the patentee. A new or improved or more economical effect, attributable to the change made by the patentee in the mode of operation of existing machinery, proves that the change has introduced a new mode of operation, which is the subject-matter of a patent, and when this is ascertained it is not a legitimate subject of inquiry at what cost to the patentee it was made, nor does the validity of the patent depend upon an opinion formed after the event, respecting the ease or difficulty of attaining it."

Also, in same case:

> "To make a valid claim for a combination it is not necessary that the several elementary parts of the combination should act simultaneously. If the elementary parts are so arranged that the successive action of each contributes some one practical result, which result when attained is the product of the simultaneous or successive action of all the elementary parts viewed as one entire whole, a valid claim for thus combining these claims may be made. Nor is it requisite to include in the claim for a combination, as elements thereof, all parts of the machine which are necessary to its action, save as they may be understood as entering into the mode of combining and arranging the elements of the combination. * * * All parts necessary to the action of the combination specified enter into the mode of combining and arranging the elements of the combination but need not be, and ought not to be, included in the combination claimed."

In *Sarven* v. *Hall*, 9 Blatch. 524, Judge Woodruff, in sustaining the second claim of the Sarven patent, conceding that the several elements had each of them been before used in carriage wheels and individually for the same purpose as in the Sarven wheel, said:

> "The plaintiff's combination is distinguished from a mere aggregation of devices in this—that there is a reciprocal action or operation of the parts upon each other and conjointly upon the entire wheel, each part giving to the other increased support and efficiency, and the two co-operating to make a stronger and more durable wheel than is produced by either without the other."

See also *Seymour* v. *Osborn*, 11 Wall, 516.

In *Cannington* v. *Nuttall*, 5 H. L. Appeals (1871), the House of Lords held that a patent could be sustained though each principle or process in it was previously known to all persons connected with the trade, provided the mode of combining these processes was new and produced a beneficial result. The following is from the syllabus:

"A patent was taken out for an improvement in the mode of manufacturing glass. The old mode had been that of putting the materials which were to form the glass in pots, placed on sieges or benches, with the fire underneath, the rising flames of which played around them, and when they become too hot and crooked, they were removed from their position and the overheated and cracked parts were presented to a current of cooling air, and the molten material was thus, partially at least, saved from waste, and the cracks in the pots were stopped up with a portion of it, and were thus preserved from destruction. The new method consisted in adopting some previous improvements (such as suppressing the fire pots, placing the materials in tank, etc.), to which the patentee laid no claim, and in combining these things with an improved furnace. His invention consisted in 'forming the sides of the tank, or chamber containing the glass making materials, hollow, in such wise that a current of refrigerating air may circulate and prevent any excessive heating of the sides which retain or inclose the fused materials.' Though all the principles upon which the new method was based were well known, the new form of combining them was shown to make the melting of the materials less subject to danger and less costly in use.

Held, That this new form of combination, being useful and valuable, constituted a valid ground for a patent.

Held, also, that a direction to a jury that, if the combination was new and was useful, the patent could be supported, though each separate process employed in it was previously known, was correct.

See also Curtis on Patents, *sec.* 111.

In *Hicks* v. *Kelsey*, 18 Wall. 670, an increase in efficiency and a saving in the operation are each mentioned as among the new and useful results which may sustain a patent.

In *Crane* v. *Price*, 1 Web. Pat. Cases, 393, the whole invention consisted in the substitution of anthracite for bituminous coal, in combination with a hot-air blast for smelting iron ore. The Court, per Tindal, C. J., sustained the patent, laying down the doctrine that if the result of the substitution was a new, a better, or a cheaper article, the introduction of the substituted material into an old process was patentable as an invention. This has been re-

cognized and quoted as an authority by authors and courts in this country and England ever since.

The Supreme Court of the United States in *Smith* v. *The Dental Vulcanite Co.*, cited this case as an authority.

In *Hill* v. *Thompson*, Web. Patent Cases, 232, Lord Eldon holds that "there may be a valid patent for a new combination of materials previously in use for the same purpose, or for a new method of applying such materials."

In *Hall* v. *Jervis*, Web. Pat. Cases, 100, the Court sustained a patent in which the invention consisted in substituting a flame of gas for a flame of oil to remove the superfluous fibres of lace.

In *Smith* v. *The Goodyear Dental Vulcanite Co.*, 3 Otto, 486, the Supreme Court referred to the superior advantage of an element in a combination over that for which it was substituted, as showing patentable invention.

See also *Brown* v. *Guild*, 23 Wall. 181.

In *Littlefield* v. *Perry*, 21 Wall. 205 (see p. 226), the Supreme Court, referring to a patented improvement, says:

> "The subsequent devices better adapted to the end to be accomplished, may therefore properly be regarded as improvements upon the original invention. They produce a stove doing the same thing which the first was intended to do, but doing it better. This is the proper object of an improvement."

VALIDITY OF REISSUES.

The specifications and claims of the reissued patents are not merely closely limited to what is shown in the original or the accompanying drawings or models. They both follow almost in identical terms the descriptions of the inventions found in the original specifications. The claims do not embrace or refer to any features not fully described in the original.

The claim of the original Ball patent is as follows:

> "The perforated interior chamber in combination with the rotary reel and the swinging platforms thereon self-discharging substantially as set forth."

The perforations of the interior chamber were shown and described as communicating with the furnace below, as in the reissue.

In neither the original nor the reissued patent is the claim limited by express terms to any particular direction of flues or communications between the baking chamber and the furnace. In each the direction of these communications shown and described is identically the same. In each the essential thing is the introduction of the direct product of combustion into the baking chamber containing the reel and swinging platforms.

Much stress has been laid upon the fact that in the specification of the reissue reference is made to the furnace as "communicating directly or indirectly in any proper manner with the chambers in which the bread-receiving shelves or platforms *h* are revolved."

The patentee neither describes nor claims any other method of communication between the furnace and bread-chamber than that described in the original. He simply notifies the public that his invention is independent of the direction of these communications. The Patent Office, in granting the reissue in this form, coincided with the patentee in holding his invention independent of the direction of these communications, and unaffected by any modification which might be made in this direction.

If Ball was the first inventor of the combination he was undoubtedly entitled in his reissue to claim it without limitations as to the direction of the communicating flues other than that they extend from the furnace into the baking chamber so as to convey the products of combustion into that chamber. The statement in the reissue that the invention is not confined to the exact direction of these flues can not vitiate the patent.

The reissue does not claim or intimate that direct communication is any part of Ball's invention. If it did, it might be objectionable as new matter.

If there were a claim inserted for such mode of communication that claim would be void as being for new matter. Even then it would not vitiate other claims for features fully described in the original.

The insertion of this phrase can not extend the Ball patent beyond what is shown in the original.

If the assumption of Ball and the Patent Office that his invention was independent of the direction of these communications was incorrect, the statement to that effect in the patent can not make it independent. If it was correct, the statement to this effect can not prejudice the patent.

The amendment introduced by the reissue only serves to give the public to understand more clearly and unmistakably what the inventor claimed, and the Patent Office adjudged, to be the scope of his invention. As the claim stood before, the patentee might very reasonably have asked the Court to construe it as having exactly the scope which it now in unmistakable terms expresses. But he has taken a course much fairer towards the public, and less embarrassing to the Court, in first going before the preliminary tribunal especially entrusted with determining what he was entitled to claim, and obtaining its authority in express terms, for the full extent of his claim, before asking the public to respect his assertion of right, or the Court to pass upon the scope of his patent.

He has done this at the sacrifice of all recovery of damages prior to the date of his reissue, and prior to the time when the public was advised in the most unambiguous terms what he claimed, and the government official especially commissioned for the purpose adjudged, to be embraced within his franchise.

The law, which formerly expressly authorized the addition of new matter to a patent, now expressly prohibits it, but it does not exclude any amendment which is based upon matter that was in the original patent or the record upon which that patent issued. To do so would have been to destroy the very purpose for which the right of reissue is provided.

Patents are usually drawn by persons who are strangers to, and ignorant of, the art within which they lie. The ordinary inventor supposes a patent, no matter what its terms, covers every thing it shows. He has no knowledge of any of the technical rules governing its construction.

His solicitor is often too ignorant of the art to understand the essential features of the invention, or too incompetent or careless to properly describe and claim them. If all the mistakes and defects that creep into the instrument by which the franchise is to be asserted, from these and other causes, were incurable, the patent law would be utterly inadequate for its purpose.

So essential to the purposes of the law, and so consistent with common law principles, did it seem to allow the patentee, whenever he found his patent did not fully and properly protect him in his invention, to amend its defects and insufficiencies, that the right to reissue for that purpose was sustained as incidental to the right to the patent before any statutory provision was made for it.

See *Grant* v. *Raymond*, 6 Pet. 218.
Shaw v. *Cooper*, 7 Pet. 292.

Scarcely any of the important inventions which have been in litigation in this country could have been protected without reissues which involved very considerable modifications in specifications and claims.

The privilege of reissue is not one which, in its exercise, is to be treated as a kind of crime.

So long as the amendment introduces nothing but what is found in the record as it existed at the time the original issued, and makes no claim which could not have been based upon what is shown in that record, there is no opportunity for fraud afforded by the reissue.

The evidence as to novelty and originality is precisely the same as if the reissue specification and claim had been submitted in the first instance, namely, the oath of the inventor, and the examination instituted by the Patent Office. This examination is more conclusive than it would have been if made on the same specification in the first instance, because it involves a review with the advantage of all that has transpired meanwhile.

If any thing not originating with the inventor is introduced there is the same remedy afforded as if the same

claim had been made in the first instance, namely, an attack upon the patent for want of novelty.

On the other hand the penalty of a forfeiture of so much of the term of the franchise as has elapsed prior to the time of reissue is a very heavy one to place upon the patentee.

There is no reason why the amendments introduced by reissue should be less kindly regarded, and liberally treated, by the Court than what is embraced in the original, unless it appears that some claim has been introduced which could not have been predicated upon any thing shown in the original record.

This Court reiterated, in the recent case of *Marsh* v. *Seymour*, 7 Otto, 348 (356), the law upon this point as it has been applied for many years in both Circuit and Supreme Court.

> "The patentee may re-describe his invention, and include in the description and claims of the specification not only what was well described before, but whatever else was suggested or substantially indicated in the old specification, drawings, or Patent Office model, which properly belong to the invention as actually made and perfected. Corrections may be made in the description, specification, or claims of the patent, where the patentee has claimed as new more than he has a right to claim, or where the description, specification, or claim is defective or insufficient; but he can not, under such an application, make material additions to the invention which were not described, suggested, nor substantially indicated in the original specifications, drawings, or Patent Office model."

Any construction of the law of reissue more restricted than this would be inconsistent with its terms, and render it utterly inadequate for its purpose.

That by "new matter" is meant merely features not found or suggested in any part of the record, is conclusively shown by the language of the statute which follows it.

> "Nor in case of a machine patent shall the models or drawings be amended, except each by the other; but when there is neither model nor drawing, amendments may be made on proof satisfactory to the commissioner, that

such new matter or amendment was part of the original invention."

If the intent of the law was to exclude, under the term "new matter," any thing which could be predicated on any part of the record, whether specification, model, or drawing, this provision for introducing evidence *de hors* the record, when model and drawing are wanting, would be exceeding absurd.

In *Carver* v. *Braintree Mf. Co.*, 2 Story, 432 (440), Justice Story says:

> "If the description of the combination of the thickness and the slope of the front and back surfaces of the rib were a part of the plaintiff's original invention (as the objection itself supposes), and were not fully stated in the original specification, that is exactly such a defect as patent acts allow to be remedied."

This has been the construction put upon the law by the Supreme Court, and, with few exceptions, by the Circuit Courts, ever since.

See *Seymour* v. *Osborn*, 11 Wall. 516.
Corn Planter Cases, 23 Wall. 181.
Marsh v. *Seymour*, 7 Otto 348 (*supra*).
Rubber Co. v. *Goodyear*, 9 Wall. 788.

The doctrine that the action of the commissioner in granting the reissue is conclusive of the question of the sufficiency of the record to warrant it, was strongly stated by Justice Story, in *Allen* v. *Blunt*, 3 Story, 742 (745).

> "In short, it may be laid down as a general rule, that, where a particular authority is confided to a public officer, to be exercised by him in his discretion upon an examination of facts, of which he is made the appropriate judge, his decision upon these facts is, in the absence of any controlling provisions, absolutely conclusive as to the existence of those facts. My opinion, therefore, is, that the grant of the present amended patent, by the commissioner of patents, is conclusive as to the existence of all the facts, which were by law necessary to entitle him to issue it; at least, unless it was apparent

> on the very face of the patent itself, without any auxiliary evidence, that he was guilty of a clear excess of authority, or that the patent was procured by a fraud between him and the patentee, which is not pretended in the present case."

The Supreme Court has adopted and often reiterated this doctrine, holding, however, that even the question of fraud was not open in a suit for infringement.

See *Seymour* v. *Osborne*, 11 Wall. 516 (543).
Rubber Co. v. *Goodyear*, 9 Wall. 788.
Smith v. *Goodyear Dental Vulcanite Co.*, 3 Otto, 486 (499).

This is but the application of a common-law rule well established in analogous cases.

See *Foley* v. *Harrison*, 15 How. 433 (448).
Bartlett v. *Kane*, 16 How. 323 (322).
Field v. *Seabury*, 19 How. 263 (272).

What is meant by such repugnancy on the face of the record as would show that the commissioner had transcended the limits of mere judgment as to the scope of the invention shown in the record is illustrated by Justice Story, in *Allen* v. *Blunt* (*supra*), by the example of a patent for a chemical compound reissued into a patent for a machine.

If the Court is to review the action of the commissioner, and only sustain the reissue when its judgment as to the sufficiency of the record to warrant it accords with his, all this language about the conclusiveness of the commissioner's action means nothing. A judgment can not be said to be conclusive where the case is to be reviewed on its merits.

Even if the Court could review the action of the commissioner all the presumptions are strongly in favor of that action, and it should not be disturbed except in a perfectly plain case where there is no reasonable theory upon which it can be supported.

In the present case no new matter has been introduced

into the specification or claim, even from other parts of the record.

It is obvious that the commissioner was correct, and that Ball's invention was not dependent upon the direction of the flues through which the products of combustion were conveyed from the furnace to the baking chamber. Modifications might be made in the course of the flues which would increase their efficiency, and constitute patentable improvements, but they involved the use of the Ball invention, and must be held subordinate to his patent.

Even if new matter had been introduced into the description it would not affect claims for the invention originally described.

In *Smith* v. *Gooyear Dental Vulcanite Co.*, 3 Otto, 486, the Supreme Court holds that though the reissued patent described certain improvements not described in the first, yet as that is not embraced in the claim it will not invalidate it. It, therefore, sustains the patent. In course of the opinion it emphasizes the fact that it must "plainly appear" that the original patent does not substantially describe what is described and claimed in the reissue, before the Court can be justified in holding the reissue void. (See p. 500.)

One void claim does not avoid the patent. *Carlton* v. *Bokee*, 17 Wall. 463 (472). The claim is limited to the substantial but not identical mode described by the language "substantially as described." (*Ibid.*)

This is true whether reference is made to the specification or not.

Tilghman v. *Mitchell*, 19 Wall. 287. The validity of the Ball reissue to the full extent of the broadest claim has been sustained by Judge Woodruff. *See certified decree in Ball* v. *Wilson*, S. D. N. Y. 1873.

The specification of the McKenzie patent is almost literally the same as that of the original, and the claim here in issue corresponds so closely, not only with what was described but with what was claimed in the original, that we

apprehend there can be no controversy but what it is a legitimate reissue.

It only serves to point out more distinctly the invention that was both described and claimed in the original, and to remove any possible doubt as to the scope of that invention. The inventor has pursued just the course frequently recommended by the courts, in removing every verbal ambiguity from his patent by reissue instead of asking the Court to solve it by construction.

Respectfully submitted,

ROBT. H. PARKINSON,

Counsel for Appellant.

OFFICE SUPREME COURT U. S.
FILED
OCT 23 1880
JAMES H. McKENNEY, Clerk.

Robert Clarke & Co., Printers, Cincinnati, O. [*October, 1880.*

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1880.

Joseph Garneau, *Appellant,*

No. 43.] *vs.*

Dozier, Weyl & Co., *Appellees.*

APPEAL FROM THE U. S. CIRCUIT COURT FOR THE EASTERN DISTRICT OF MISSOURI.

BRIEF FOR RESPONDENTS AND APPELLEES.

WOOD & BOYD,
Counsel for Appellees.

INDEX.

Statement of Case..... 1

Anticipations..... 2–12

Lack of Utility..... 12–15

No Invention..... 15–19

Reissues not for same inventions as the original patents, and claims broader than the inventions..... 19–23

Infringement..... 23–28

Robert Clarke & Co., Printers, Cincinnati, O. [*October, 1880.*

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1880.

Joseph Garneau, *Appellant,*

No. 413.] *vs.*

Dozier, Weyl & Co., *Appellees.*

APPEAL FROM THE U. S. CIRCUIT COURT FOR THE EASTERN DISTRICT OF MISSOURI.

BRIEF FOR RESPONDENTS AND APPELLEES.

STATEMENT.

The amended bill is founded on two letters patent for improvements in bake ovens:

1. Letters patent granted to Hosea Ball, September 23, 1856, reissued October 12, 1869, and a second time June 14, 1870, and extended for seven years from September 23, 1870, the original patent having been assigned to complainant for the county of St. Louis, August 15, 1868.
2. Letters patent granted to McKenzie, May 1, 1860, reissued April 19, 1870, extended for seven years, and reissued a second time, April 20, 1875, and assigned to complainant for the county of St. Louis, June 2, 1874.

The claims which are alleged to be infringed are:

BALL.—"1. One or more swinging bread holders suspended from the arms or end plate of a rotary reel,

INDEX.

Robert Clarke & Co., Printers, Cincinnati, O. [*October, 1880.*

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1880.

Joseph Garneau, *Appellant,*

No. 43.] *vs.*

Dozier, Weyl & Co., *Appellees.*

APPEAL FROM THE U. S. CIRCUIT COURT FOR THE EASTERN DISTRICT OF MISSOURI.

BRIEF FOR RESPONDENTS AND APPELLEES.

STATEMENT.

The amended bill is founded on two letters patent for improvements in bake ovens:

1. Letters patent granted to Hosea Ball, September 23, 1856, reissued October 12, 1869, and a second time June 14, 1870, and extended for seven years from September 23, 1870, the original patent having been assigned to complainant for the county of St. Louis, August 15, 1868.
2. Letters patent granted to McKenzie, May 1, 1860, reissued April 19, 1870, extended for seven years, and reissued a second time, April 20, 1875, and assigned to complainant for the county of St. Louis, June 2, 1874.

The claims which are alleged to be infringed are:

BALL.—"1. One or more swinging bread holders suspended from the arms or end plate of a rotary reel,

in combination with a furnace so arranged and connected that the products of combustion will pass into or through the chamber within which the bread-holders move."

McKENZIE.—"1. The combination of the following elements, to wit: a furnace or fire-place (one or more), a baking-chamber arranged above such furnace or fire-place, and in direct communication therewith, and a rotating reel located within said baking-chamber and provided with gravitating pans or shelves, arranged or hung around the shaft of said reel from rods attached to the end plates or arms thereof, substantially as and for the purpose described."

DEFENSES.

The answers set up several grounds of defense applible to both patents:

1. *Want of Novelty.*
2. *No Invention.*
3. *Reissue not for same Invention as the original Patent.*
4. *Claims broader than the Invention.*
5. *No Infringement.* *Pp.* 6, 16, 18.

And further, as to the Ball reissue, that it had been found to be invalid by the decree of the Circuit Court of the United States for the Southern District of Ohio. P. 17.

We have not seen the brief of counsel for appellant, and do not know the grounds of appeal relied on, and, consequently, this brief is written without regard thereto.

STATE OF THE ART AT THE DATE OF THE BALL INVENTION.

Ovens existed long prior to the inventions in controversy, in which were swinging bread-holders suspended from the arms of a rotating reel within a chamber over the fire, and into which the products of combustion entered.

Many others employed different devices for carrying the material to be baked; but all provided for the heated gases arising from the furnace to pass directly into and through the baking chamber.

Of the reel ovens, the earliest offered in evidence is

that of Mr. Carot, patented in France, March 31, 1840. (*Rec.*, p. 110.)

This exhibit shows a cylindrical oven with double walls; in the interior chamber of which revolves a reel, with gravitating bread pans, substantially like Ball's or McKenzie's. The gases arising from the fire chamber pass through the space between the walls, and thus surround the inner chamber.

The shaft is described as hollow, and provided with perforations for the emission of gases arising from the material being baked; but it is obvious that while the heat within the rotary chamber is pincipally radiated, yet the whole being surrounded by the ascending heated gases, a current would be created through the openings in the shaft, and more on less of the gases would pass through the baking chamber.

This is the opinion of our expert, Mr. Millward. (*Ans.* 6, *Rec.*, p. 76.)

The difference between this device and Ball's is that the inner walls of the latter have numerous openings, while the former has only two.

A great portion of the heat used in the Ball and McKenzie ovens, to raise the temperature in the baking chamber, is received by radiation from the walls thereof.

It seems to us that the "direct heat," to use the language of the Ball patent, received into the baking chambers of the Ball, McKenzie, and Carot ovens respectively, differs only in degree, and, so far as the Ball is concerned, this depends on the dampers, which are so imperfectly shown that it is impossible to understand their operation, but it is very clear that when open, the products of combustion would pass through the flues surrounding the perforated inner chamber, and out at the chimney, without entering that chamber, and there is not a word in the original or reissued patents to indicate when or how the dampers are to be opened or closed, whether before or during the process of baking.

COVELET OVEN.

See addition to *Rec.*, *p.* 12.

This is also a French oven, patented in 1846, with two additions in 1847, and one in 1848.

Covelet says the oven may be built in all shapes and in all sizes. He then describes a shaft with arms carrying swinging bread holders precisely like Ball's, and the mechanism for revolving the same. It also shows and describes the combustion chamber directly under the reel chamber, and separated from it by an iron plate. In these three respects, as well as the opening for the introduction and removal of the bread, it is substantially like Ball's furnace, reel, and inner chamber, without the perforations, but the products of combustion, direct from the furnace, instead of being carried into flues connecting with the reel chamber by openings in the walls as shown in Ball's patent, are conveyed through flues which wind along the inner wall of the oven, passing the air a second time through a heated chamber it becomes superheated, and finally leading into the chimney without coming in contact with the oven except by radiation. A system of dampers or valves is also described for the regulation of the draught, and temperature of the oven.

Of this mode of heating Covelet says:

> "During that triple transit, symmetrical on each side of the oven, the heat generated is utilized to its greatest extent."

He then describes two lateral ovens, OO, figs. 3 and 4, plate two, one at either side of the furnace G, and says:

> "Air enters through the flues *l*, then through the wall forming the furnace G, and radiates around the recepticles OO; that air is heated to a high temperature in its transit through the hot walls of the furnace, the draught is regulated by dampers *m m*, in its exit from the small ovens OO; that air is thereby used for the oven supply."

And again, in first addition, *Rec.*, *p.* 16, says:

> "Not less important is the fact that the dampers placed near the furnace admit, when required, in the interior of the oven the air, which, attracted from outside, is heated around the furnace, and by its introduction into the oven through the dampers increases, regulates, or varies the interior temperature."

And again, in second addition, *Rec.*, *p.* 13, he says:

> "The working of the dampers, as I have already mentioned, consists in distributing, when needed, in the interior of the oven, so as to vary the temperature, a current of air, which, attracted from the interior, by openings, is heated around the furnace."

And, in the third addition, says:

> "The economy of fuel is such that, if figures were given, it would appear incredible, even to persons having experience in such matters."

Exactly what was intended to cover by the expression in Ball's claim, "products of combustion," it is not necessary to inquire, because in the original patent the same thing is expressed by the simple word "heat."

By *products of combustion*, as used in the claim, must be understood the hot-air by which the oven is heated, and this hot-air is obtained in the usual way by a free supply of fresh air coming in contact with the heating surfaces of the furnace. The products of combustion, strictly speaking, contain narcotic poisons, and, in every well regulated heating apparatus, are carried to the chimney.

There are certain laws of chemistry and philosophy which must be recognized in the construction of hot-air furnaces, but we know of no property in air heated by passing through a furnace that is not in air heated by contact with the radiating surfaces of a heating furnace, except the noxious gases of combustion.

In the Covelet oven the heated currents of air pass *directly* into the baking chamber through the bottom thereof,

and freely circulate around the material being baked; the only difference between it and Ball or McKenzie's oven being that Covelet, in addition to their manner of heating, provides another, and, instead of using impure gases, uses only pure ones.

This Covelet patent was not introduced in the Ohio cases, as here presented, yet the Court in that case say:

> "Although our judgment goes upon another ground, and we have not, therefore, fully considered whether the patent for this combination is void, because no invention is involved in making it, still such is our strong impression . . . previous patents had, in express terms, pointed out the mode, and claimed as a benefit the direct application of heat to a baking chamber." (6 O. G. 934.)

And the Court below say:

> "It is doubtful whether even a specific device, such as is intimated, would show sufficient inventive skill to make the same patentable."

It seems to us that the Carot and Covelet exhibits are decisive of this matter, and that to sustain the Ball and McKenzie patents they must be limited to their peculiar construction, which the appellants do not employ or infringe. And here, in passing, allow us to say that for thirteen out of the fourteen years for which the Ball patent was granted, he never made any claim, except for his peculiar construction, which fact of itself should be sufficient to deprive him of any equity against the respondents, who, before the assertion of this new right, duly paid an intervening patentee for the privilege of erecting and operating their ovens as constructed.

Sickles v. *Falls Co.*, 2 Fisher, 200.

We have shown that the Carot oven in a slight degree admitted the *products of combustion*, or the direct rays of heat directly from the furnace to the baking chamber, and that the Covelet oven provides for the circulation of heated currents of air around the material being baked,

transmitted directly from the furnace to the baking chamber through openings in the bottom, so that as they rise they shall come in direct contact with the dough on the revolving carrier.

The Covelet oven provides for the exposure of the material being baked, to the direct action of the heated gases, while being revolved at pleasure in the baking chamber, and for regulating the temperature.

In our opinion, there is no difference in principle between the Covelet oven and that of Ball or McKenzie, and hence the broad claims of the reissues can not be sustained.

The Carot and Covelet patents are the only ones that we claim fully anticipate all the elements of the Ball claim; but as against the McKenzie claim we cite the Ball and Jennison patents in addition.

The difference between the Ball and McKenzie ovens is only structural, and can not support the broad claim of the latter.

The Commissioner of Patents, on the extension of the former, thus speaks of these two ovens:

> "The application for extension is opposed by Duncan McKenzie, to whom letters patent were granted May 1, 1860, for improvement in bakers' oven, in which substantially the same oven was described, except that, instead of introducing the products of combustion into the oven through apertures in the side and rear walls, as in Ball's oven, he uses short inclined flues, extending from the top of the arches of his furnace to a point in the floor of the oven near the side walls. So far as this arrangement is shown in McKenzie's patent, it does not seem materially different in effect from the lower row of apertures in Ball's oven. It is probable, however, that a modification of both, by which the heat should enter directly from the top of the arches by vertical flues, would be preferable to either." *Com. Decisions*, 1870, *p.* 110.

Appellant's expert also finds points of similarity, as follows (*Rec.*, *p.* 44):

"*X-Q.* 6. What features distinguish the elements of the first claim of the 'McKenzie reissue' from the elements of the first claim of the Ball reissue?

A. There are the same number of element in each, to wit, a furnace, baking chamber, and a rotating reel provided with gravitating pans or shells, suspended from the arms or end plates, the difference being in the construction and arrangement of the baking chamber and furnace with relation to the reel, and this difference is indicated in the two claims by the following language in the one: 'Arranged and connected so that the products of combustion will pass into or through the chamber within which the bread holders move;' and the following language in the other: 'A baking chamber arranged above such furnace or fire place, and in direct communication therewith.' Both ovens, of course, fall within the scope of the first quotation: but one only of these two, the McKenzie, falls within the scope of the last quotation."

Ball so changed the plan of the Smith and other old ovens that gaseous currents would not ascend into the baking chamber directly from the furnace, and the particular construction was new so far we know, and, if fulfilling the other requisites of the law, was properly patentable. But McKenzie can make no such claim to novelty. It may be true—though we doubt it—that he improved the Ball construction, but so far as introducing the heated air through the bottom of the oven is concerned, he simply adopted the Smith or Covelet plan, unless the claim be limited to his peculiar construction.

JENNISON PATENT (*Rec. pp.* 123–9).

This patent is older than McKenzie's, being dated February 1, 1859, but appellant, on rebuttal, offered some proof tending to carry the date of McKenzie's invention back of the Jennison patent.

Without stopping to criticise these proofs, we may admit, for sake of the argument, all that they can possibly be claimed to establish, viz., that McKenzie perfected his invention in the spring of 1858.

To meet this new state of facts defendants filed a supplemental answer, and the proofs show a use by Jennison of an oven, in all respects like that patented to him, from the spring of 1857.

W. A. Root, 86.
L. Hilton, 85.
J. Byrns, 88.

Therefore, for convenience, the Jennison patent will be referred to instead of the use.

Mr. Jennison, in describing his invention, recognizing the fact that reels and endless chains were old as bread carriers in ovens, does not assert any claim to invention therein, but says that the principal features of the invention consist in such a construction of the oven that the products of combustion will be admitted directly upward into the baking chamber, in combination with a carrier for changing the position in the oven of the articles to be baked, open communication between the furnace and baking chamber being described. He also says that while preferring the carrier described, it is not essential to a realization of his invention, and that any carrier which will change the position of the bread in the baking chamber may be used.

He also describes flues for regulating the draught before and during the baking.

The record shows that reels and endless chains had long been used in ovens, and we can not see any function which one performs that the other does not. The office of each is to present a pan opposite the opening where it receives its load and passes downward until another is presented, and so on until all the pans are loaded. It is then revolved at pleasure until the baking is completed, when the pans are again presented at the opening and their load discharged. Both are reels, but only one is precisely like an angler's reel.

McKenzie and Jennison have each rods extending across from side to side, and upon each rod is a pendulous shelf or bread pan, the only difference being that the ends

of McKenzie's rods are connected with circular plates and Jennison's with chains.

Complainant's expert does not think the Jennison oven like McKenzie's, because it has not the construction of reel particularly described in the claim, or any mechanical equivalent thereof in construction or operation, but he does not give any reason; unless it be that in the Jennison the pans hang above each other, so that the lower ones are interposed between the furnace and those higher up.

Were the flues D in the McKenzie oven in the center or even at the front and rear of the oven the same would be true of the McKenzie, but if the feature is objectionable in the Jennison what shall be thought of the McKenzie which has a solid floor, which certainly will more effectually prevent the gases from rising directly against the pans.

To us it seems very clear that the Jennison reel is the equivalent of the McKenzie reel, and that therefore it anticipates the first claim. Mr. Henry Millward having been asked (*p.* 79) to compare the two, says:

> "In order that my answer may be clearly understood, I will describe the construction of both ovens. I find the 'Jennison patent' describes an oven square at its base, and elongated in a vertical direction, in which travels a bread carrier substantially the same, although a little different in configuration to the one described in the old French patent, with the products of combustion from the fire chamber, unobstructed in its passage up to and around said reel, as is fully described in the first claim of his patent of the date and number before given; whereas, in the McKenzie oven I find a reel precisely the same as the one described in the old French patent, except in the number of the gravitating pans depending from the said reel with the products from the fire chamber ascending through flues or apertures leading from the said fire chamber to the reel, substantially the same as the mode described in the Smith patent, viz: A fire place with an arch top provided with apertures for the entrance of the gaseous emission into the baking chamber; I am therefore clearly

of the opinion, that if the arch over the fire place, which is shown in the McKenzie drawing was removed, they would be substantially the same in all its features as the one shown and described in the Jennison patent; but if the claim be intended to cover an oven, with the top of the fire place covered with a brick arch and perforated for the introduction of the gases to the baking chamber, there is a substantial difference in the two ovens. I say, if it is intended to cover the oven with the arch top fire place, for the reason that the drawing and specification describes such an oven; whereas the claim describes one where the baking chamber is arranged above the fire place and in direct communication therewith."

But suppose the reels not to be the same, Jennison was still the first to introduce the products of combustion directly under the bread carrier, and having shown one well known form of carrier, it would not be invention to substitute Ball's reel.

McKenzie never thought that an open fire in the bottom of the oven could be used, and it was not until after others demonstrated that that was the only correct plan, that he thought of claiming any thing of the kind. In 1870, ten years after the original grant, he reissued his patent, without making any claim except for his peculiar arrangement of flues and dampers, and it was not until after the patent had been extended, and the open furnace oven had gone into general use, that he thought of claiming such a structure.

So impracticable did McKenzie, in 1862, consider the open fire, that he thought it "would burn all the iron up in the oven."

J. Hall, p. 64.

Some years later, John Bailie had an oven constructed like defendants', which McKenzie called to see; and after examination said that it would not answer, and that after trying it Bailie might put in *his* furnace.

J. Bailie, p. 84.

Thus not only again expressing the opinion that an open furnace was impracticable, but inferentially admitting that it was entirely different from his invention, while it is now claimed to be the same.

UTILITY.

In appellant's brief, just received, we find five defects in the Ball invention specified on pages 6 and 7.

Complainants' witnesses agree that bottom heat is necessary to the perfect baking of bread in a mechanical oven.

Bright, Ans. 10, *p.* 36.

McKenzie, Ques. 53, *p.* 32.

This heat from the bottom, which Bright says doubles the capacity of an oven, could not be obtained, and was not intended to be obtained by the McKenzie principle, for the truth of which we appeal to the drawing, and the original specification and Patent Office model, the particular description being omitted from the reissue which is designed to claim more than McKenzie ever thought of inventing.

The drawing of the reissue and the model, show the flues *D* inclining from the side of the arch over the fire to points near the walls of the baking chamber, none being shown except at the two sides near the walls.

It is obvious that the heated gases escaping from the inclined flues would strike the contiguous wall and ascend close to the same, so that very little, if any, of the direct rays would strike the ends of the shelves of the reel. With reference to this the original specification says, the two furnaces communicate "with the oven above by flues which are directed towards the walls of the oven, as indicated by red arrows, figure 1." After the fires are well lighted the lower dampers are to be opened, "when a downward draught will take place, and the heated air escaping from the flues *D* will rise to the top of the oven *on the sides*, and then decend in the center of the oven" and escape.

It does not appear that an oven with flues like McKenzie describes was ever built, and we think it is obvious that such an arragement would be a failure, for it is clear that it

was not intended to get a direct heat from the bottom, but on the contrary every protection against it was carefully studied.

Therefore the advantages which complainant's foreman and witness, Bright, mentions are not attributable to the McKenzie invention of 1860, but to the use of substantially the Jennison principle of heating, or that which McKenzie showed for the first time in his patent of October 15, 1872. *Rec. p.* 131.

Ball and McKenzie seem to have had the same object in view, viz.: to secure a uniform temperature throughout the baking chamber. McKenzie says in his original patent and again in the first reissue, "The heated air and gases will thus be made to circulate and rotate in the oven, and diffuse their heat through the entire oven in a uniform and rapid manner."

Ball thought it necessary that the floor of the oven should be unbroken, and McKenzie thought it necessary that the entire center and principal part, being all that portion directly over the furnaces, should be in like manner unbroken, with only such openings as would cause the gases to ascend close by the side walls.

McKenzie may have improved the Ball oven, but he could more easily have made a greater improvement in another way, and that also without invention.

The baking chamber in the Ball oven has a row of apertures in the side and rear walls near the floor, and if McKenzie had closed the remaining apertures and side chambers above the lower apertures, so that all the products of combustion would enter through the lower ones, he would have better improved the Ball oven than he did, for the reason that the flues being horizontal the heated gases would be drawn or projected towards the center of the oven and ascend around the pans, affording in some degree the advantages of "bottom heat."

The slight structural difference between the Ball and McKenzie ovens is referred to by the Commissioner of Patents, on the extension of the patent of the former,

and the construction of ovens, like those used by the complainant, suggested thus:

> "The application for extension is opposed by Duncan McKenzie, to whom letters patent were granted May 1, 1860, for improvement in Bakers' Oven, in which substantially the same oven was described, except that, instead of introducing the products of combustion into the oven through apertures in the side and rear walls, as in Ball's oven, he uses short inclined flues, extending from the top of the arches of his furnace to a point in the floor of the oven near the side walls. So far as this arrangement is shown in McKenzie's patent, it does not seem materially different in effect from the lower row of apertures in Ball's oven. It is probable, however, that a modification of both, by which the heat should enter directly from the top of the arches by vertical flues, would be preferable to either." *Com. Decisions*, 1870, *p.* 110.

Complainants' oven seems to be constructed in accordance with the Commissioner's suggestion. Bright says, *Ans.* 16, *p.* 36, "The heat enters through what we call pigeon holes, from the side and top of the fire arch."

If McKenzie's invention possesses sufficient utility to entitle it to protection, it must be for his particular construction, but there is no proof that it was ever used. The testimony of Bright as to the advantages of heat from the bottom must all be credited to Jennison, as the form of oven described is very nearly like his, but it is not as perfect as those which conform exactly.

Bright states the increase of work done by the use of substantially an open furnace to be 40 to 50 per cent. (*Ans.* 11, *p.* 36.)

McKenzie says it will save half the fuel. (*Ques.* 53, *p.* 32.)

Withington used a similar oven as Bright for a number of years, and then had the brick work entirely removed, which caused a saving of 300 bushels of coal per month with two ovens. *P.* 96.

Hall says it will burn from 20 to 30 per cent. less fuel,

and costs from $300 to $500 less to build. (*P.* 62.) And Withington and Hall agree that the open oven requires much less repairs.

Now, if we understand the testimony of complainant's expert, F. Millward, he thinks the McKenzie oven valuable because of its improvement over Ball's and the French oven, and these improvements consist in so arranging the parts as to greatly increase its capacity for work with any given quantity of fuel. This clearly is the opinion of McKenzie.

If this constitutes invention, of what a high order must Jennison's be, because we have shown that every so called McKenzie oven about which there is a word in the Record, is the antithesis of that shown and described by McKenzie in his original patent and model, and in fact substantially like Jennison's.

McKenzie says: "I firmly believe it is a saving of half the fuel; also by these apertures the heat is equalized all over the bottom of the oven; it makes no matter which part of the pan the crackers are on, they all get the same bake." (*Ques.* 53, *p.* 32.)

McKenzie has been infringing the Jennison invention so long that he doubtless has forgotten what his own was, or he never would speak so strongly in favor of that which could not by any possibility be accomplished by his arrangement.

INVENTION.

We have seen that appellant's counsel admits that the Ball invention was defective in five important particulars, all of which are essential to the successful operation of baking, and that the cure is not found in the McKenzie patent, but in the ovens built in substantial accord with the Jennison invention, which the appellees own; no credit is therefore due to McKenzie; but we contend that no invention was involved even if it be held that the *products of combustion* of the reissues are not identical with those of the Covelet or Carot patents.

The reel is shown to be an old and familiar device, and McKenzie says they worked on the same principle as Ball's. (*Ans.* 58, *p.* 33.)

The Sellique, Vicars, and Smith patents all show and describe the products of combustion passing direct from the fire and surrounding the dough during the baking. None of these, however, employ the reel.

The Smith patent has an endless metal band or platform traveling through it over an open furnace, upon which are placed the articles to be baked.

It is also true than the oven shown is considerably longer than it is high, but this we do not consider material. The products of combustion are described and shown as passing into and through the chamber containing the bread and the mechanical carrier.

This patent, then, supplies what was wanting, namely, the products of combustion passing into and through the bread chamber.

Mr. Smith says that for some materials to be baked, the carrying plates on which they were placed would get too hot in passing over the fire, and therefore makes provision for cooling them. What does Ball do? He takes Smith's bread chamber, builds a close covering over the furnaces, erects three perforated walls, forming an inner chamber with the covering over the furnace for a floor, and within this chamber, substitutes the well known rotating reel for Smith's "railway" traveling bread carrier.

Is this invention? If it is, we repeat it is of such a low order as to be fully protected by his original claim, or the 2d and 3d of the reissue.

But we now propose to show that exactly what Ball did is pointed out by Mr. Smith in his patent. Though Mr. Smith shows what is known as "railway ovens," his improvement is equally applicable to a reel oven, and as the statement of the nature of his invention says it has reference *mainly* to that class, the inference is conclusive that it refers to other classes also.

We quote from his specification:

> "My invention for improvements in baking ovens have reference mainly to the class of ovens known to biscuit bakers as 'railway ovens,' that is, an oven hav-

ing an endless metal band or platform the width of the oven traveling through it, and upon which are placed the articles to be baked, etc. (*Rec. p.* 117.)

He then describes ovens used before his invention as follows:

"These ovens are now heated by covered or inclosed flues above and below the oven (or opening) through which the endless band travels."

"The present system of heating these ovens by inclosed flues is objectionable, on account of the great consumption of fuel required to heat them, and at the same time the want of a sufficient control to enable the baker to regulate the action of the heat within the oven. Now the object of my invention is, first, to economize the heat and have it more under the control of the baker."

"To economize the heat, in the first place; I do not inclose the lower flues on the upper side (as now practiced), except the portion immediately above and for a short distance below the fire place (or places, where more than one fire is used), as I have found by experience that the endless metal band or platform, which travels over it, answers all the purpose, the heat acting directly upon it, the intervention of brick work or other substance being dispensed with.

"Secondly, I introduce between the folds of the endless band a current or currents of hot air from the fire place."

"The heat from the upper flue is allowed to act directly upon the biscuit or other articles within the oven."

"Having described my invention I claim:

"Secondly the direct application of heat to ovens having traveling bottoms. Substantially, and in the manner hereinbefore described."

Now let us apply the above quotations to a reel oven, "heated by inclosed flues," and which system of heating Mr. Smith says was objectionable, for reasons given, and follow his instructions as to the remedy, which is simply to give the flues open and direct communication with the bread chamber, so that the products of combustion may pass into and through that chamber as he clearly shows it.

The merest novice in the art with a reel oven before him and with a knowledge of its objectionable system of heating, and Mr. Smith's declaration that the way to remedy this was instead of carrying the products of combustion around its inner walls in inclosed flues, to substitute direct communication between the furnace and baking chamber, would without a thought worthy of the name of invention, adopt well known mechanical means for its accomplishment, even had not Covelet described it.

Ball did not invent the revolving reel; nor an oven with a revolving reel; nor was he the first to pass the products of combustion into and through the bread chamber; nor was he the first to provide automatic devices for the delivery of the bread when baked: but so far as we know he was the first to construct a double chamber oven, the inner one of which had three of its walls numerously pierced, and its floor solid, together with the tripping device. Hence his original claim was perfectly legitimate, if useful, as it combined the old elements with the new.

But this infinitesimally small and practically worthless invention certainly can not be the foundation for rendering the patent so elastic as to suppress the use of useful devices which do not in any way employ his perforated walls.

Burr v. *Duryee*, 1 Wall. 577.

McKenzie did not, in our opinion, invent any thing.

Mr. Millward, after examining these old patents, expresses the opinion that no invention is involved in the production of the combination claimed by Ball.

Ans. 14, *p.* 79.

Ans. 17, *p.* 81.

And the Court, in the Ohio case, says:

"Although our judgment goes upon another ground, and we have not, therefore, fully considered whether the patent for this combination is void because no invention is involved in making it, *still such is our strong impression.*

. . . "We should feel that we were carrying the doctrine which protects slight inventions to the last

limit, if we were to hold the combination of the reel and furnace in this case involved invention." 6 *O. G.* 933.

This Court, in *Simpson* v. *Woodman*, 10 Wall. 117, say:

"Where a roller in a particular combination had been used before without designs on it, and a roller with designs on it had also been used in another combination, it was not a patentable invention to place designs on the roller in the first named combination. Such a change, with the existing knowledge in the art, involved simply mechanical skill, which is not patentable."

The operation of the hot air in the reissues is precisely the same as in any of the older ones, which carried it into direct contract with the dough, and there is no change in the operation of the reel; hence, the combinations are merely aggregations, and not patentable.

Hailes v. *Van Wormer*, 20 Wall. 353.

REISSUES NOT FOR THE SAME INVENTION AS THE ORIGINAL PATENTS, AND THE CLAIMS BROADER THAN THE INVENTIONS.

The practice of the Patent Office has been to give a very liberal construction to the act providing for reissues, very often allowing claims in a reissue which had been refused on the original application, and the history of patents in courts shows that nearly every claim which has been declared to be broader than the invention is found in a reisued patent; and "it is through this door of new matter that so many frauds have crept into reissues, and so much injustice has been done to subsequent inventors of valuable improvements."

It is not necessary for us to cite cases to this Court on this question.

A certified copy of the original letters patent and certified duplicates of the models are in evidence.

We therefore invite a comparison of the original specification with the new, and proceed to point out what clearly appears to us to be interpolations.

1. As to the Ball reissue, we object to the words "reel revolving," and to the word "revolved," for the reason that the reel is not a "revolving reel."

2. "Direct heat."

3. "C, the combustion chamber, which communicates *directly* or indirectly in any proper manner with the chamber in which the bread-receiving shelves or platforms, H, are *revolved*."

We object to the whole of this quotation, but particularly to the words "direct" and "directly," and confidently refer to the drawing and model as showing that the only communication between the combustion chamber and bread chamber is *indirect*, and there is not a word in the original specification to indicate the possibility of any other than *indirect* communication between these chambers.

Mr. Millward says: "Indirect currents are those which pass from one chamber to another, through an intervening one." Ball has only shown one way in which the gases can reach the bread chamber from the furnace, and that is by indirectly passing through an intermediate chamber, and the words "in any proper manner," can not help him, as he has not shown or described any but the one way, nor even hinted that it could be accomplished in any other manner. The fact that the reel is at rest during the baking also shows that his aim was to prevent the heat entering directly.

We object to the paragraph:

4. "The reel may be rotated as required during the baking operation, to apply an equal heat to the bread upon the several shelves or platforms."

Because, 1. The model and drawing show that the reel can not revolve without discharging its load, and because the original specification says "when the baking is completed, the reel is revolved" for the purpose of discharging its load.

2. Because the original specification distinctly declares that "all parts of the interior chamber are rendered available for baking purposes, . . . all parts being equally

well heated," which language rebuts all idea of the necessity for the reel to revolve.

We submit that it is upon the interpolations designated the first claim of the reissue must be sustained, if at all.

A fair test of whether the claim is not broader than the invention, will be to read it in connection with the original specification, model, and drawing; and this test we invite, as we think it will clearly appear that the interpolations mentioned, and the further words of the claim, "so arranged and connected that the products of combustion will pass into or through the chamber within which the bread holder moves," are not responsive to any thing described in the specification or shown in the model.

For as there is a free passage for the products of combustion up the hollow walls on three sides of the reel chamber direct to the chimney, the products of combustion must pass through these side flues or hollow walls, direct to the chimney. Dampers are mentioned, but are so imperfectly described as not to render their operation intelligible, and no direction is given to enable any one to know when they are to be moved one way or another.

The opinion of Mr. Com'r Fisher, already referred to, was reviewed by the acting commissioner January 31, 1873, in the matter of the extension of the Jennison patent.

> "In the matter of the application of George C. Jennison for the extension of letters patent, No. 22,809, for 'improvement in ovens,' granted February 1, 1859, and reissued March 5, 1872.
>
> "At the hearing of this case, an argument in opposition to the extension was admitted; but as no reasons of opposition or testimony had been filed previously, it was necessarily confined to the record.
>
> "The first claim of the reissued patent is attacked for want of novelty in the invention.
>
> "The following is the claim: 'Arranging the heating chamber directly under the cooking chamber and in direct communication with it, in combination with a carrier adapted to change the position in the cooking chamber of the bread or other material to be cooked.'

"Among the several references cited, only one, the 1856 patent of Hosea Ball, deserves attention; none of the others have the heating chamber arranged directly under the cooking chamber.

"In the Ball patent this arrangement is shown, but the heating chamber is not 'in direct communication' with the cooking chamber, an important limitation in Jennison's claim. It is true that in the reissue patents obtained by Ball it is stated that the communication between the chambers may be either direct or indirect, but the statement is not authorized by the original record, and ought not to have been permitted in the reissue. But even if it were properly in the patent, I should not regard it sufficient to impeach the novelty of the invention claimed by Jennison.

"It is a mere suggestion, without description or illustration to indicate how it may be carried into effect, and under the practice of the office would not be regarded as a satisfactory answer to the claim, if it were now before the office for the first time in an original application. I find the case meritorious in all other particulars, and the patent will therefore be extended."

To which may be added the closing sentence in Judge Emmons' opinion:

"We decide this case against the complainant because convinced that not only had the patentee no notion whatever that he had included in his device what is claimed, in the reissue, but because neither the patent, specification, nor model would have suggested it to any one." *Ball* v. *Withington*, 6 *O. G.* 935.

We have already shown that the original McKenzie patent limits the invention, and we are clearly of opinion that the Court below was right in saying (*Rec.* 133):

"Next the claim under the McKenzie patent is either too broad or limited to a specific device. Under proper rules of construction most favorable to plaintiff it must be held that the specific device, if any, mentioned in said claim is alone included within the terms of the patent. It is doubtful whether even a

> specific device, such as intimated, would show sufficient inventive skill to make the same patentable. However that may be, the defendants are not using plaintiff's device, and therefore are not guilty of any infringement."

INFRINGEMENT.

Having incidentally treated of this question in discussing that of novelty, but little remains to be said. Infringement generally depends on the construction of the claims, and we admit that if the first claims of the reissues are to be broadly construed, defendants infringe; but we consider the defendants and complainants devices, as exhibited by the models and drawings, the very antithesis of each other, and therefore think that there can not be any foundation for claims broad enough to cover both.

A glance at the Ball Patent Office model and his original specification will show that the prevailing idea in the mind of the inventor was to so introduce the heated gases into the interior chamber that all parts of it should be at the same temperature; and to avoid too high a temperature at the bottom—an objection mentioned by Smith—he made his floor entire. He says (*Rec. p.* 120):

> "By this construction, all parts of the interior chamber are rendered available for baking purposes, the lower part as well as the upper, the construction of the baking chamber causing all parts to be equally well heated."

The reel is not a "rotating reel" in any proper sense, or in the sense that defendants' is, because it does not and could not rotate during the process of baking, and "all parts of the chamber being equally well heated," it is not necessary that it should; while with the defendant's it is absolutely necessary that it should constantly rotate during the process of baking.

For proof that Ball's reel could not rotate during the baking, we refer:

1. To the drawing, which shows a chute, G, against which the platforms come in turn as the reel is revolved, and there discharge their load.

2. The specification says :

> "When the baking is *completed*, the reel is revolved, causing the front edge of each platform to come in contact with the guide, *g*, and by the depression thus produced causing the platform to assume the angle of the chute, and discharge its load thereon, whence it passes to a receiver outside of the oven." (*Rec.*, *p.* 120.)

The original patent claimed this tripping device as an element of the invention, and the model bears witness to the correctness of the above description of its operation.

Now the point we desire to make, is this, if making the fire on the floor of the bread chamber, and within the chamber, as defendants do, is the same as making it in the furnace underneath the floor, and carrying the heated gases into the chamber indirectly through perforations in the side walls, as Ball does, then Ball's oven would be a practical device with the fire on the floor of its reel chamber.

This we submit is logical, but what would be the result of such a change in the Ball oven ?

It is not necessary for us to say that the gases as they are emitted from the fire are hotter than after diffusion through the chamber, hence the temperature in the lower part of the chamber near the fire is much higher than at the top, and hence the necessity in defendant's oven of keeping the reels revolving during the process of baking; but this being impossible in Ball's oven, the result clearly would be that the bread on the lower shelves nearest the fire would be burned, while that on the highest would not be baked at all. And for this reason we say the two inventions are not substantially alike, and that that of Ball can not support a claim which will embrace the other.

Appellant, in his brief filed, apparently relies on the opinion of the Commissioner of Patents, as establishing the novelty of his invention; but it is very evident that it was only by "splitting hairs" that the novelty of the patent was sustained, and that the Commissioner was in a very sympathetic mood at the time, and that the extension was

more for the purpose of delivering Ball from the hands of the "Philistines," who were said to have captured him, than as a reward of merit.

But the conclusions the Commissioner found it necessary to draw in order to sustain the novelty, are based on false premises—premises which, as a matter of fact, did not exist; hence, his conclusions are also false.

He says:—(*C. D.*, 1870, *p.* 110.)

> "It must be remembered that the invention is an improvement in ovens" (why this should be particularly remembered is not understood, as all inventions are, technically, improvements in the particular art to which they belong), "and the single purpose to be attained is the baking of bread. The reel and the heat are but accessories to the production of the result.
>
> "*The office of the reel is not merely to revolve as a piece of mechanism, but primarily to carry the dough, and to present it at the right moment and in the best manner to the action of the heat.* . . . .
>
> "*The reel in its revolution conveyed the bread from the bottom of the chamber to the top, and down again; and a much better opportunity was afforded for the circulation of the heat around the dough to be baked.*"

It is only necessary, in reply to this, to remark that the reel does not and could not do any of the things claimed for it, as we have already abundantly shown; but we use the opinion to show the advantages of, and necessity for, such operation of the reel in the defendants' oven.

The Commissioner also finds that there were objections to the Smith oven because the bread could only advance in a straight line.

How much greater, we ask, must be the objections to a reel which could not move at all during the baking?

It is, however, upon this false assumption of the operation of Ball's reel that the patentability of the combination was sustained by the Commissioner.

The opinions of the Commissioner of Patents, though in their nature judicial, are not at best of a very high order

of authority; but, as appellant refers to them, it may be interesting, as well as instructive, to glance at the record of the Patent Office since the grant to Ball in 1856.

Three years later, July 1, 1859, a patent was granted to Jennison, which was reissued March 5, 1872, and extended February 1, 1873, one claim of which is as follows:

> "Arranging the heating chamber directly under the cooking chamber, and in direct communication with it, in combination with a carrier adapted to change the position in the cooking chamber of the bread or other material to be cooked." (*Rec. p.* 129.)

We have not suggested any construction for the first claims, simply because, in view of the other claims which more than cover the inventions but which it is not claimed the defendants infringe; and, in view of the state of the art, we think it impossible to give any saving construction to them.

McKenzie testifies that the defendant's oven is different in principle of construction and mode of operation from Ball's (*Rec., p.* 32):

> "*Cross-Q.* 51. You have spoken of the Ball plan of heating, and you will please look at respondent's exhibit 'Ball's original patent,' and state whether you understand the oven and mode of heating there shown and described?
> "*Ans.* I do; I think thoroughly.
> "*Cross-Q.* 52. State whether you consider defendants' said ovens to be substantially the same in principle of construction and mode of operation, as that shown and described in said exhibit 'Ball's original patent,' or substantially different?
> "(Objected to.)
> "*Ans.* Substantially different."

This answer of McKenzie is as fatal to his own patent as that of Ball, for it is contended that the former's oven is only a modification of the latter's.

On page 12 of appellant's brief will be found a very flattering discription of the many virtues of the defendants'

oven, and opposite a drawing illustrating its operations. We quote the following admission:

> "The heavier products of combustion, while being carried through the baking chamber and forced to pass over its floor and under the bread, are diverted from actual contact with the bread, and their deleterious effects avoided while their heat is utilized."

These deleterious gases are illustrated by the heavier arrows on the drawing.

Opposite is a *fancy* sketch called complainant's oven, in which the lighter gases are shown as ascending through the center of the oven, and the heavier ones passing over the floor to the rear escape. If this correctly represents the complainant's oven it illustrates the fact that he is not using the invention in controversy, for it does not bear any likeness to Ball's construction, and is opposed to the description of McKenzie in important particulars.

1. There is not a word, in the McKenzie original or reissue patents, intimating that the noxious gases do not circulate through the chamber, but, on the contrary, it is said in the original (*Rec.* 100):

> "The heated air escaping from the flues D, will rise to the top of the oven on the sides, and then descend in the center. . . . The heated air will thus be made to circulate and rotate in the oven."

And again in the reissue (*Rec.* 103):

> "The heated air and gaseous products which enter the oven, . . . will rise to the top of the oven on the sides and descend in the center."

2. In this fancy sketch the gases are represented as escaping at the rear opening, in order, I suppose, to make the likeness to defendant's oven perfect, and this while both dampers are shown as open. Now, the peculiar construction of this draft-flue was originally an element of McKenzie s invention, and then and now in the reissue, page 103, he says:

"If the flue, I, were extended horizontally, the draught through the damper opening at the back end of the flue would be greater than the corresponding opening at the opposite end, but by the enlargement and downward extension of the rear end of the flue, the draught through both damper openings is rendered uniform."

Respectfully submitted,

EDWARD BOYD,

and

E. E. WOOD,

Counsel for Appellees.

CINCINNATI, *Oct.* 20, 1880.

No 282.

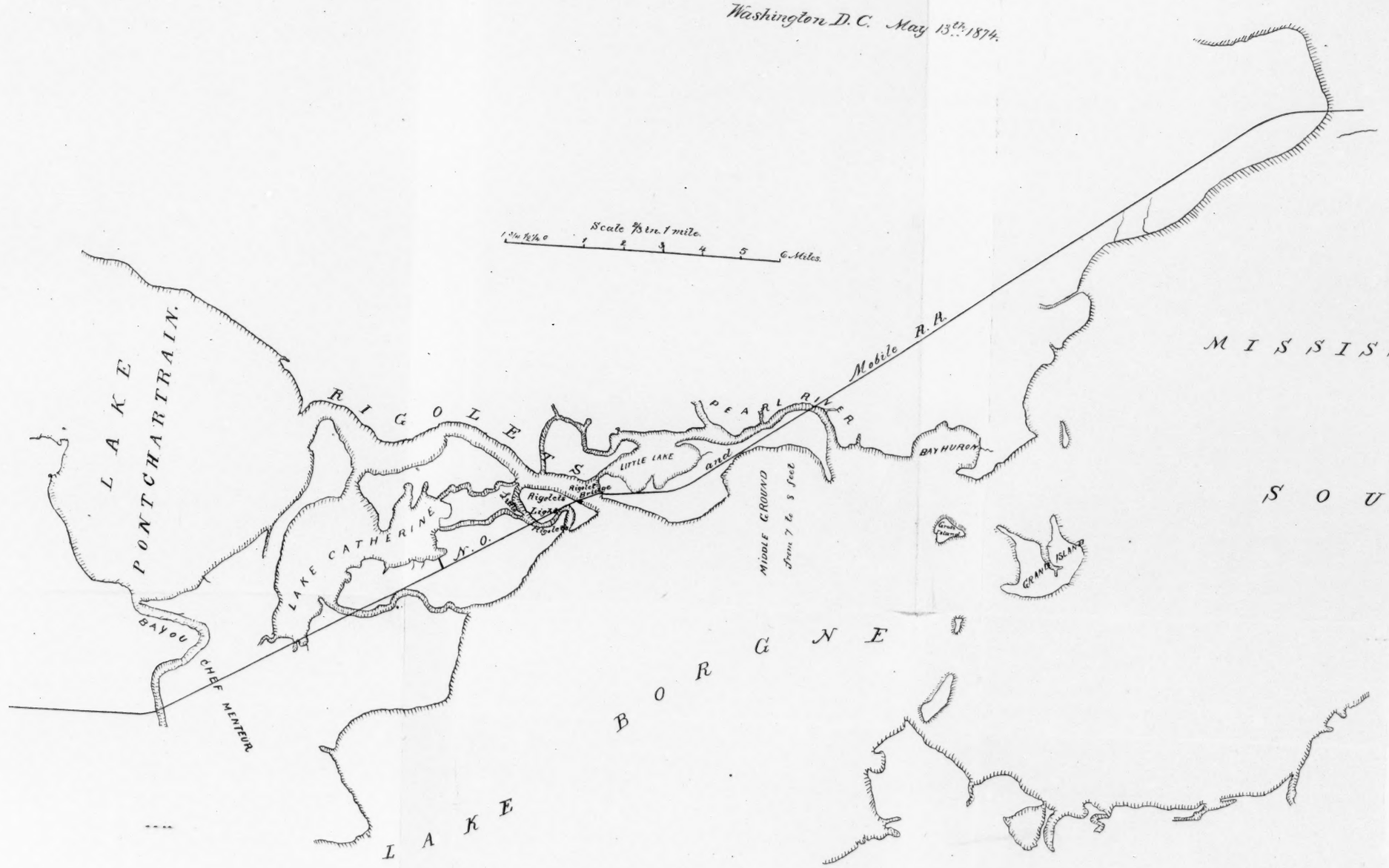
N.O., M., & T. R.R.Co.

94. page 32.

Mississippi

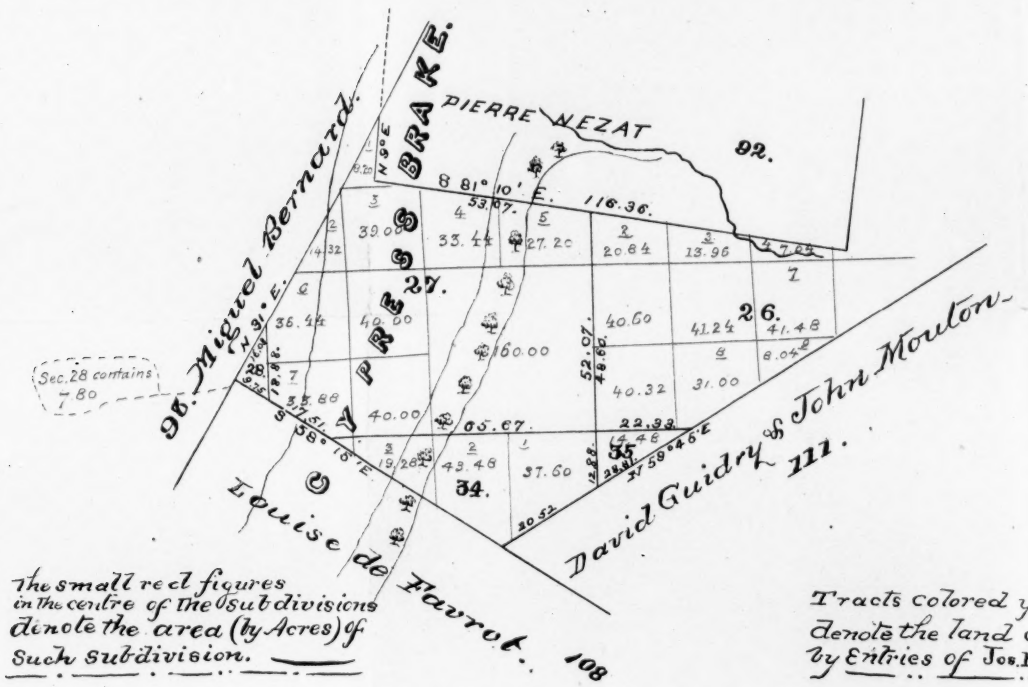
Copied from the Archives in the Office of the Chief of Engineers, U.S.A.

Washington D.C. May 13th 1874.



No. 525
Suard et al
v.
Comeau et al
} page 160

T 8 S R 5 E
SOUTH WESTERN DIST' LA,.



The small red figures in the centre of the Subdivisions denote the area (by Acres) of such subdivision.

Tracts colored yellow denote the land covered by Entries of Jos. M. Moore.

Note

the above sketch represents Sections 27. 28 & 34 in Township 8 South of Range 5 East. as they appear upon the official approved map on file in this office, and I the undersigned do hereby certify that said above sketch is a true and correct Extract from said approved map.

"A"

Thomas J Tully
Clerk U S Cons Land Office
New Orleans La Dec 10" 1877.

43

Mr. S. V. Martin
Parish Surveyor

You will please Survey and divide into lots of from ten to fifty arpents the land of Wm H. Seward an absentee.

Said land Seized in Suit entitled Alexandre Deslonde Wm H. Seward for an absentee and will be offered for Sale by Order of Court. On the 2d day of Oct. A. D. 1875

(Signed) J. B. Comeau Sheff
Parish of St. Martin

This 22d day of Sept. A. D. 75.

No. 525. Seward et al. } page 160
v. Comeau et al }

T. 8. S. R. 5 E

T. 8. S. R 6 E S.W. Dist. La.

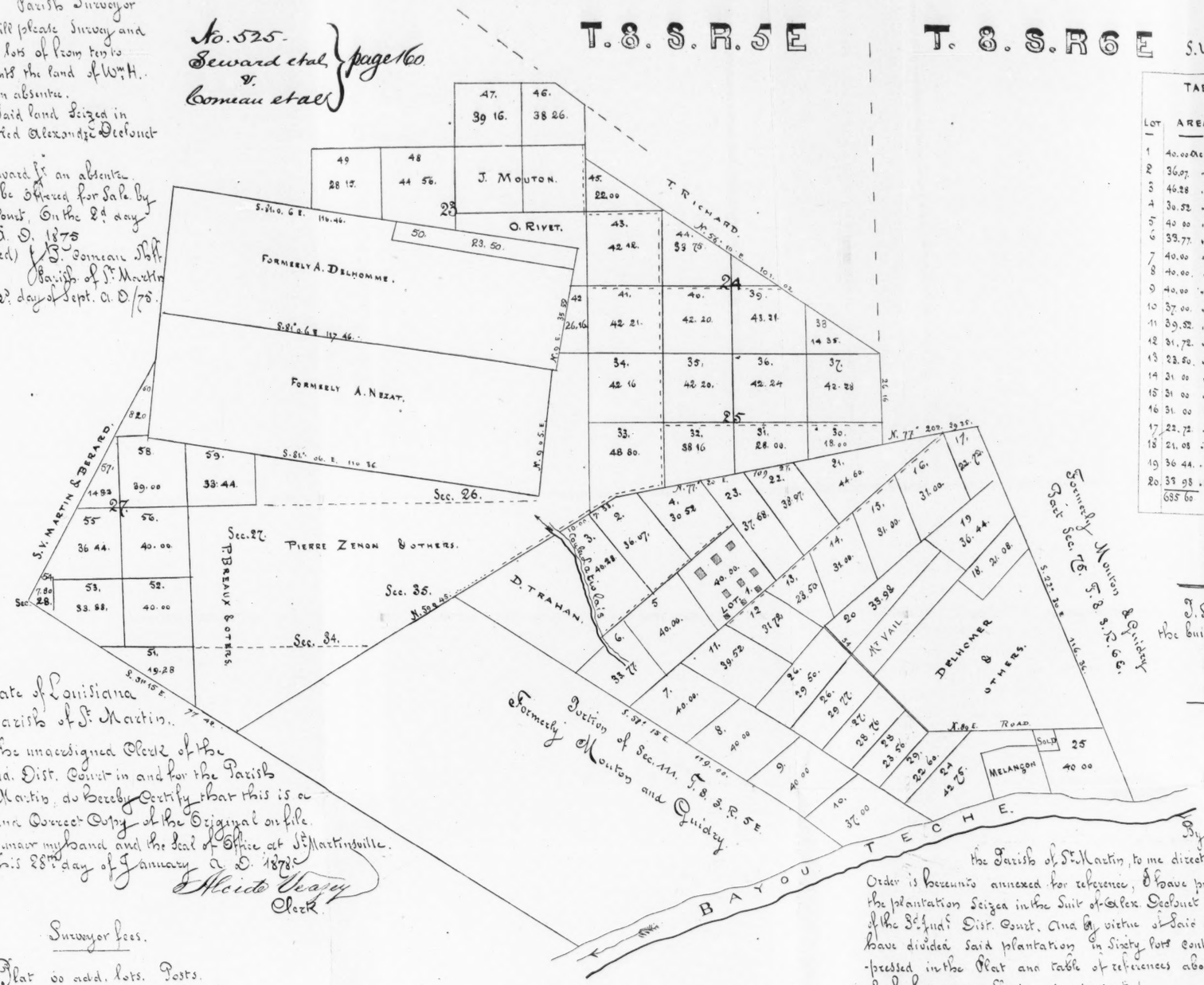


TABLE OF AREA.

Lot	Area.	Lot	Area.	Lot	Area.
1	40.00 Acres	21	44.60 Acres	41	42.21 Acres
2	36.07 "	22	38.97 "	42	26.16 "
3	46.28 "	23	37.68 "	43	42.12 "
4	30.52 "	24	42.75 "	44	33.75 "
5	40 00 "	25	40 00 "	45	22 00 "
6	33.77 "	26	29.77 "	46	38 26 "
7	40.00 "	27	28.76 "	47	39.76 "
8	40.00 "	28	23.56 "	48	44.56 "
9	40.00 "	29	22.60 "	49	28.15 "
10	37.00 "	30	18 00 "	50	23.50 "
11	39.52 "	31	28.00 "	51	19.28 "
12	31.78 "	32	32.16 "	52	40.00 "
13	23.50 "	33	48 80 "	53	33.88 "
14	31 00 "	34	42.16 "	54	7.80 "
15	31 00 "	35	42.20 "	55	36.44 "
16	31 00 "	36	42 24 "	56	40 00 "
17	22.72 "	37	42.28 "	57	14 32 "
18	21.08 "	38	14.35 "	58	39 00 "
19	36 44 "	39	43.21 "	59	33 44 "
20	33.98 "	40	42.20 "	60	8 20 "
	695 60 "		704.29 "		612.83 "

612 83.
704.24.
695 60.

Superficial Area 2.002.72.

J. S. Lot No One (1) contains all the buildings.

Dotted lines means, Right of Way.

State of Louisiana
Parish of St. Martin.

I, the undersigned Clerk of the 2d Jud. Dist. Court in and for the Parish of St. Martin, do Hereby Certify that this is a true and Correct Copy of the Original on file. Given under my hand and the Seal of Office at St. Martinsville. This 28th day of January A. D. 1878.

Alcide Deary
Clerk

Surveyor fees.

Plat 60 add. lots. Posts.
Chainers. Chaining $ 300.00

By virtue of the Order from the Sheriff of the Parish of St. Martin, to me directed in my Official Capacity which Order is hereunto annexed for reference, I have proceeded to Survey and did Survey the plantation Seized in the Suit of Alex. Deslonde vs. W. H. Seward No 3000 of the docket of the 2d Jud. Dist. Court. And by virtue of said Order and under said Survey, I have divided said plantation in Sixty lots containing the number of acres expressed in the Plat and table of references above and annexed and having such form and Shape as represented.

This being a due return of my proceedings under the law and Order aforesaid.

St. Martinsville September 27th 1875.

Signed J. V. Martin
Parish Surveyor.

Chainers { Omer Zenon
E. Zenon.

Grants of School Lands to States and Territories.

Region in which school lands have been granted.	Grants of land for use of schools in each township wherein the grant ed lands were situated.	Grants of land in each township for use of schools generally.	Grants of salt springs to States, marked †	Date of grant.			Grant where found in U. S. Stats.		Nature of act containing the grant.
				Day.	Month.	Year.	Vol.	Page.	
Territory N.W. Ohio river	16			20	May	1785	1*	565	Providing for sale of lands.
Specified tract on Ohio river	16			23	July	1787	1*	573	Providing for sale of lands.
Ohio	16		†	30	April	1802	2	175	Enabling act.
Mississippi Territory	16			3	March	1803	2	234	For sale of lands south of Tenn.
Indiana Territory	16		†	26	March	1804	2	279	For disposal of lands in Indiana Ter.
Indiana	16		†	19	April	1816	3	290	Enabling act.
Orleans Territory, W. Dis.	16		†	21	April	1806	2	394	Adjustment of land titles.
Louisiana Territory	16		†	15	Feb.	1811	2	621	Adjustment of land titles.
Louisiana Territory	16		†	3	March	1811	2	665	Adjustment of claims to land.
Missouri	16		†	6	March	1820	3	547	Enabling act.
Illinois	16		†	18	April	1818	3	430	Enabling act.
Alabama Territory	16			20	April	1818	3	467	Sale of public lands.
Alabama	16		†	2	March	1819	3	491	Enabling act.
Michigan		16	†	23	June	1836	5	59	Enabling act.
Arkansas	16		†	23	June	1836	5	58	Supplemental act admitting State.
Florida	16			3	March	1845	5	788	Supplemental to act for admission.
Iowa		16	†	3	March	1845	5	789	Supplemental to act for admission.
Wisconsin		16	†	6	Aug.	1846	9	58	Enabling act.
Oregon Territory		16 & 36		14	Aug.	1848	9	330	Act organizing Territory.
Oregon		16 & 36	†	14	Feb.	1859	11	383	Act admitting the State.
Minnesota Territory		16 & 36		3	March	1849	9	408	Act organizing Territory.
Minnesota		16 & 36	†	26	Feb.	1857	11	167	Enabling act.
New Mexico Territory		16 & 36		9	Sept.	1850	9	452	Act organizing Territory.
Utah Territory		16 & 36		9	Sept.	1850	9	457	Act organizing Territory.
Washington Territory		16 & 36		2	March	1853	10	179	Act organizing Territory.
California	16 & 36			3	March	1853	10	246	Survey of public lands in California.
Nebraska Territory		16 & 36		30	May	1854	10	283	Act organizing Territory.
Nebraska		16 & 36	†	19	April	1864	13	49	Enabling act.
Kansas Territory		16 & 36		30	May	1854	10	289	Act organizing Territory.
Kansas		16 & 36	†	29	Jan.	1861	12	127	Act admitting State.
Colorado Territory		16 & 36		28	Feb.	1861	12	176	Act organizing Territory.
Colorado Territory		16 & 36		21	March	1864	13	34	Enabling act.
Colorado		16 & 36	†	3	March	1875	18	474	Enabling act.
Nevada Territory		16 & 36		2	March	1861	12	214	Act organizing Territory.
Nevada		16 & 36		21	March	1864	13	32	Enabling act.
Dakota Territory		16 & 36		2	March	1861	12	243	Act organizing Territory.
Idaho Territory		16 & 36		3	March	1863	12	814	Act organizing Territory.
Montana Territory		16 & 36		26	May	1864	13	91	Act organizing Territory.
Wyoming Territory		16 & 36		25	July	1868	15	183	Act organizing Territory.

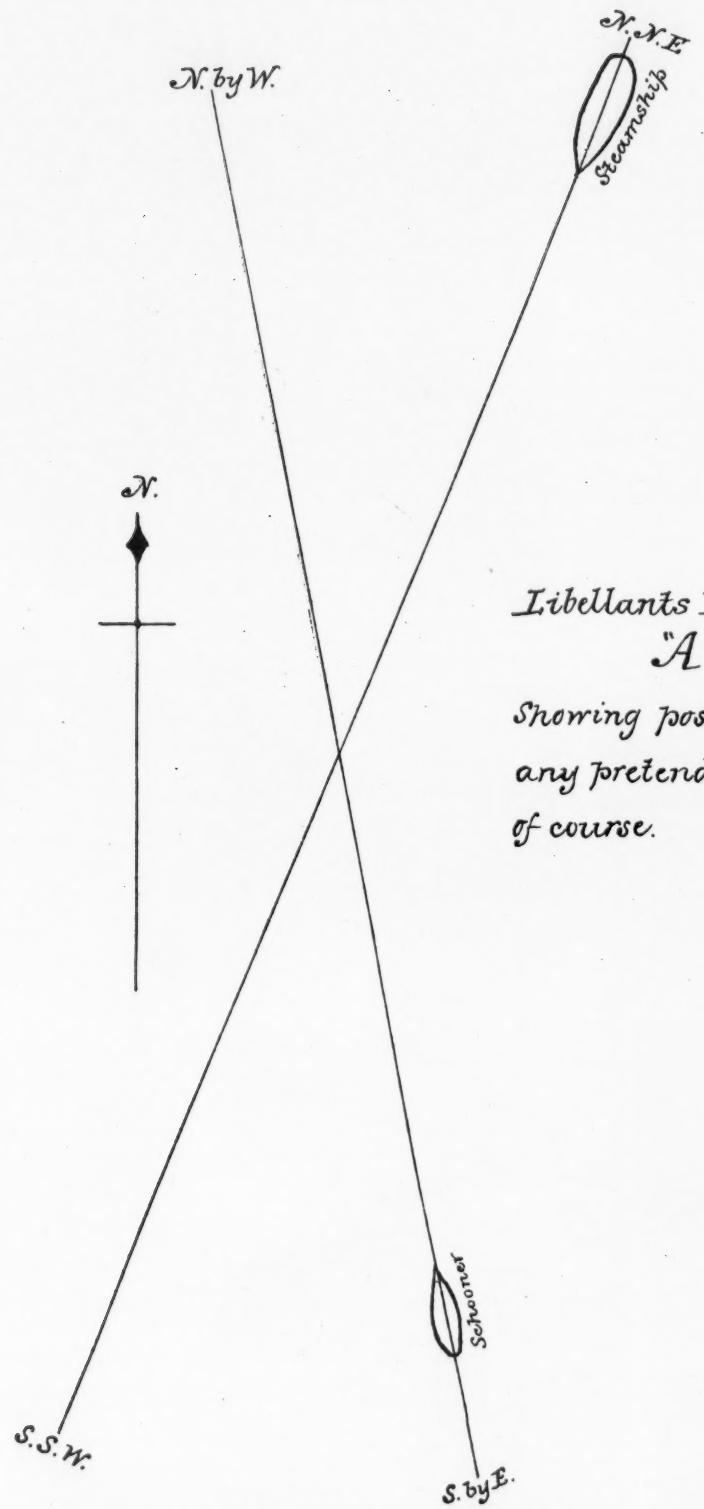
* Bioren and Duane edition.

In Re M Kanger / U S Sup Court at
vs / Washington.
City of N.O. / Reply to Defts Brief

The authorities cited from the Supreme Court of La, do not apply to Plff's Case, because the Plffs in those cases, accepted the act of 1870 and registered their Judgments and because the foundation of their claims were upon Contracts made with the City subsequent to the Act of 1870, & therefore subject to its provisions, ~~&~~ two features which entirely distinguish them from the Case at Bar, & ~~to~~ making them inapplicable. As was said in 30 ann 82 "The Claims asserted by relator accrued in 1876 under the dominion of the Act of 1870, so that there is no question as to legislative interpretation with vested rights & pre existing Contracts or obligations. The act in no manner violates the Organic law &c"

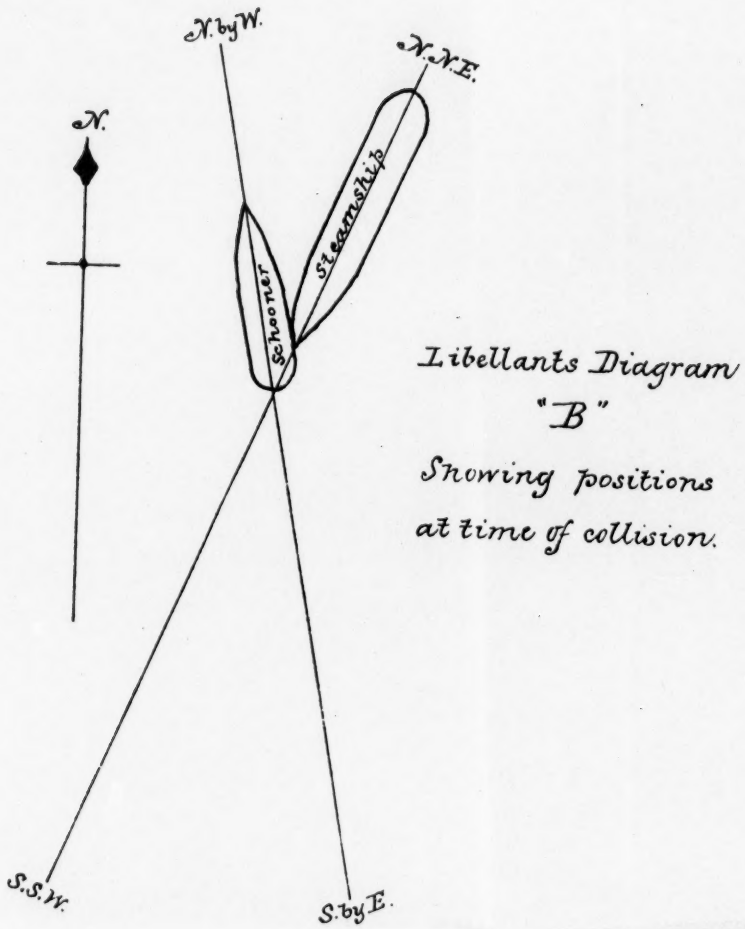
As to the next point made by Defts in Error, it has been fully discussed & decided by Judge Billings in 3d Wood p 119. & in 4 Woods not repeated negatively. Judge Billings says "In my opinion the practice act of Congress has not adopted the exceptions law, with reference to the City of N.O." p 123. 3d Woods. R.

Respy Submitted
L C Labatt



Libellants Diagram
"A".

Showing positions before any pretended change of course.



Libellants Diagram
"B"

Showing positions at time of collision.

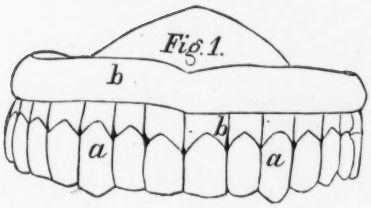


Fig. 1.
b
a
b
a

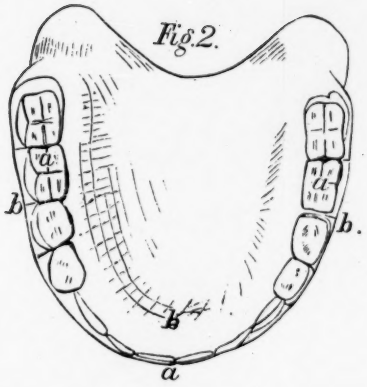


Fig. 2.
a
b
b
b
a

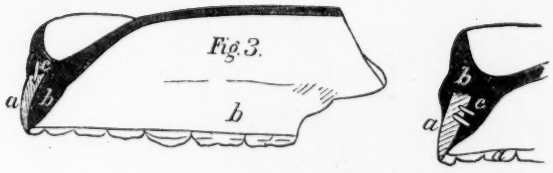


Fig. 3.
a
c
b
b
b
a
c

Fig. 1.

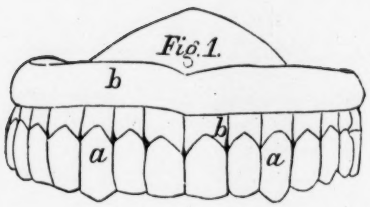


Fig. 2.

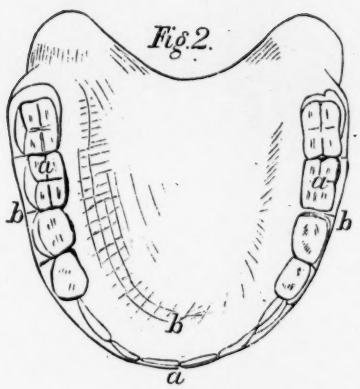
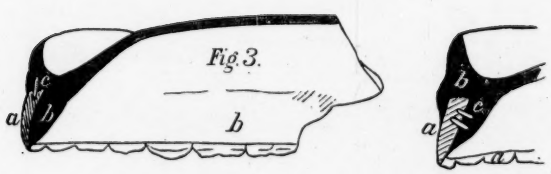


Fig. 3.



John W. Hyatt jr. and I. Smith Hyatt's

Improved Apparatus for Moulding Dental Plates.

No. 121,522. Patented Dec. 5, 1871.

Fig. I.

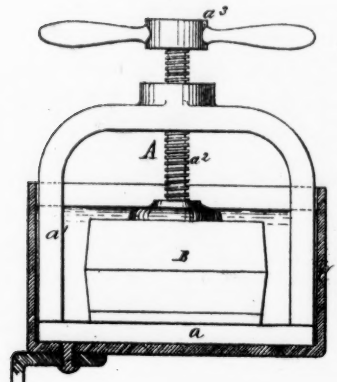


Fig. II.

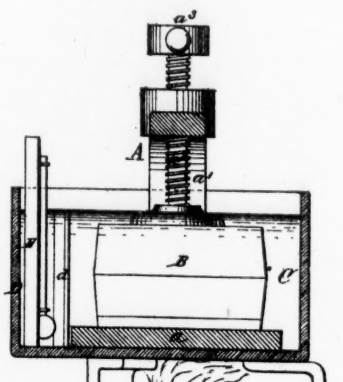
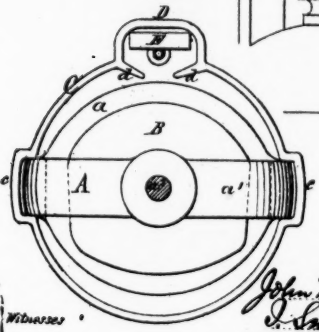


Fig. III.



Witnesses:
Jno. J. Bonner
Edward Wilhelm

John W. Hyatt Jr. Inventors
I. Smith Hyatt
by Jay Hyatt
Atty.

I. S. & J. W. HYATT.

Apparatus and Processes for Molding Celluloids and the Compounds of Pyroxyline.

No. 152,232. Patented June 23, 1874.

Fig. 1.

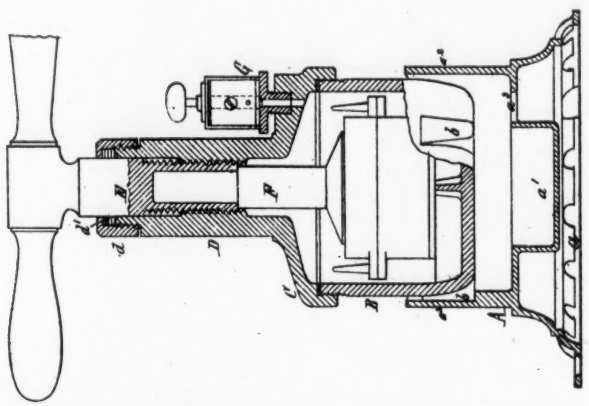
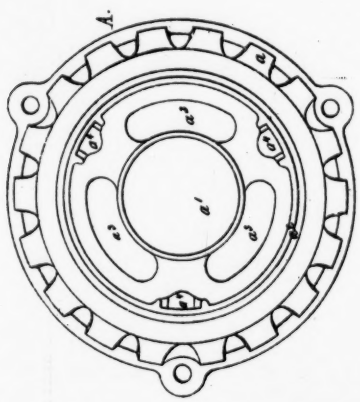


Fig. 2.



Witnesses:
J. J. Bonner
Ernst Hoddick

Inventors
J. Smith Hyatt
John W. Hyatt
by Jaij Hyatt
Atty.

B

John A. Cummings. Artificial Plates and Gums.

Filed Apr. 12. 1855.

Fig. 1.

Fig. 2.

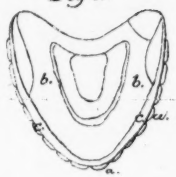


Fig. 3.

Witnesses:
Emerson
Joseph Gavell

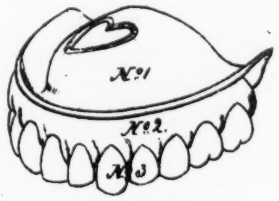
John A. Cummings

J. Allen.

Setting Mineral Teeth.

No. 8621. Patented Dec. 23. 1851.

No. 442. Reissued Mar. 24. 1857.



51.

M. Loomis.

Artificial Teeth

No. 10,817. Patented May. 2. 1854

696 a

S. Clayton.
Porcelain Teeth

No. 12,150. Patented Jan. 2. 1855.

Fig. 1.

Fig. 2.

Fig. 3.

100a

A. A. Blandy.

Casting Plates for Artificial Teeth.

No. 16708. Patented Mar. 3. 1857.

Fig. 5.

Fig. 6.

Fig. 3.

Fig. 2.

Fig. 1.

Fig. 4.

746a

R. Haering,

Artificial Teeth,

Filed Mar. 25, 1856.

Fig: 1.

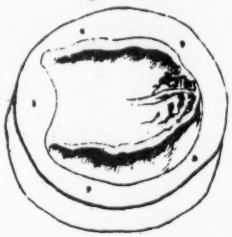


Fig: 2.

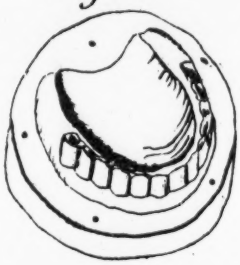


Fig: 3.

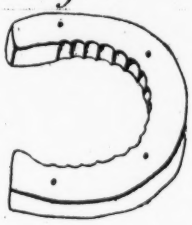
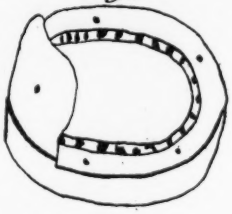


Fig: 4.



A.D. 1857. May 1. N° 1232.
BLANDY'S SPECIFICATION.

(1 SHEET)

FIG. 1.

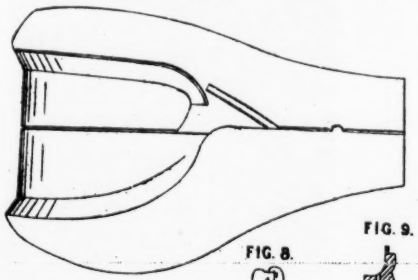


FIG. 5.

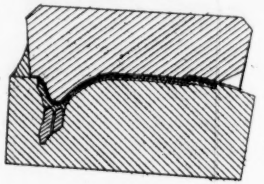


FIG. 6.

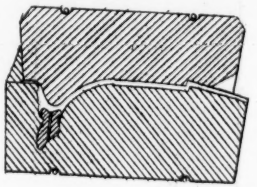


FIG. 8.

FIG. 9.

FIG. 7.

FIG. 11.

FIG. 10.

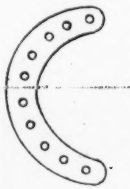


FIG. 2.

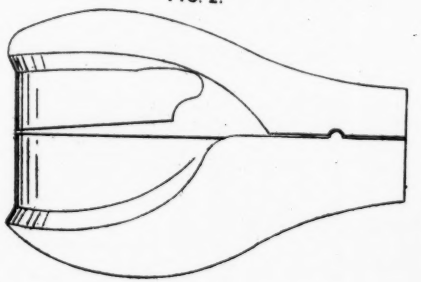


FIG. 3.

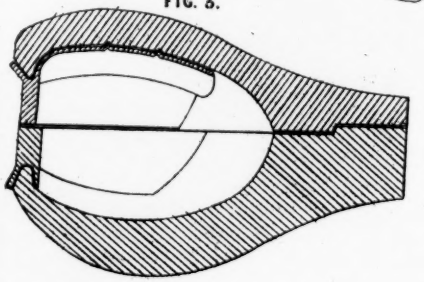
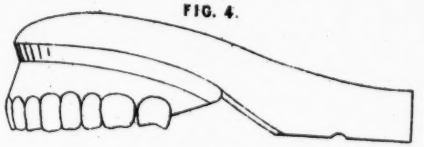


FIG. 12.

FIG. 13.

FIG. 4.



The filed drawing is partly colored

20

756a

Fig. 1.

Fig. 2.

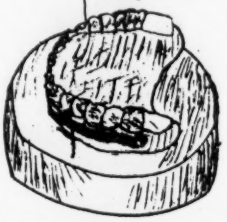


Fig. 3.

Fig. 4.

Fig. 5.

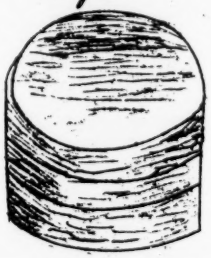
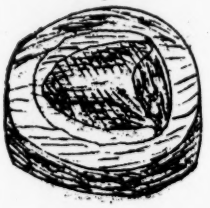


Fig. 6.



Witness.

L. Pitkin

Wm. Tibbetts

Robert Downing

2

756

Fig. 1.

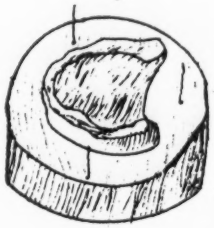


Fig. 2.

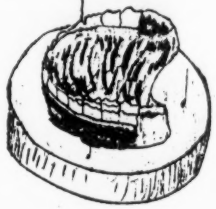


Fig. 3

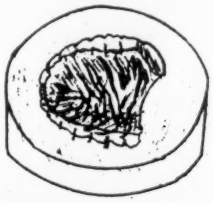


Fig. 4.

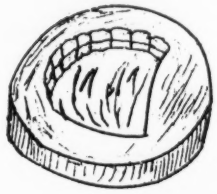


Fig. 5.

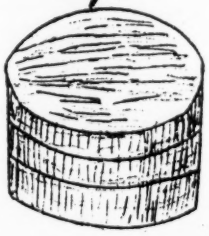
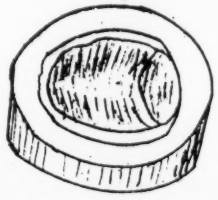


Fig. 6.



Witness.

L. Pittin

Wm. Lifley

Robert Haering

22

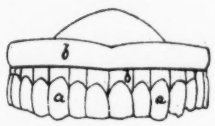
853w

J. A. Cummings.

Artificial Gums & Palate.

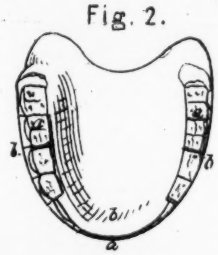
No 43,009. Patented June 7, 1864.

Fig. 1.



FRONT.

Fig. 2.



SOFFIT

Fig. 3.

SECTION

Witnesses:

L. S. Bowen

J. L. Coombs

Inventor:

John A. Cummings

by

F. Bowen

his atty

23

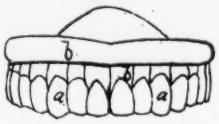
868 a

J. A. Cummings.

Artificial Gums & Palate.

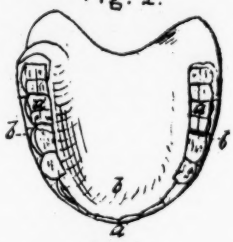
No 1904. Reissued Mch 21. 1865.

Fig. 1



FRONT

Fig. 2.



SOFFIT

Fig. 3.

SECTION

Witnesses:

S. D. Bowers

J. L. Coombs

Inventor

John A. Cummings

by

A. Bowers

his atty

A.D. 1854 March 9. № 562.

SMITH'S SPECIFICATION

(1 Sh

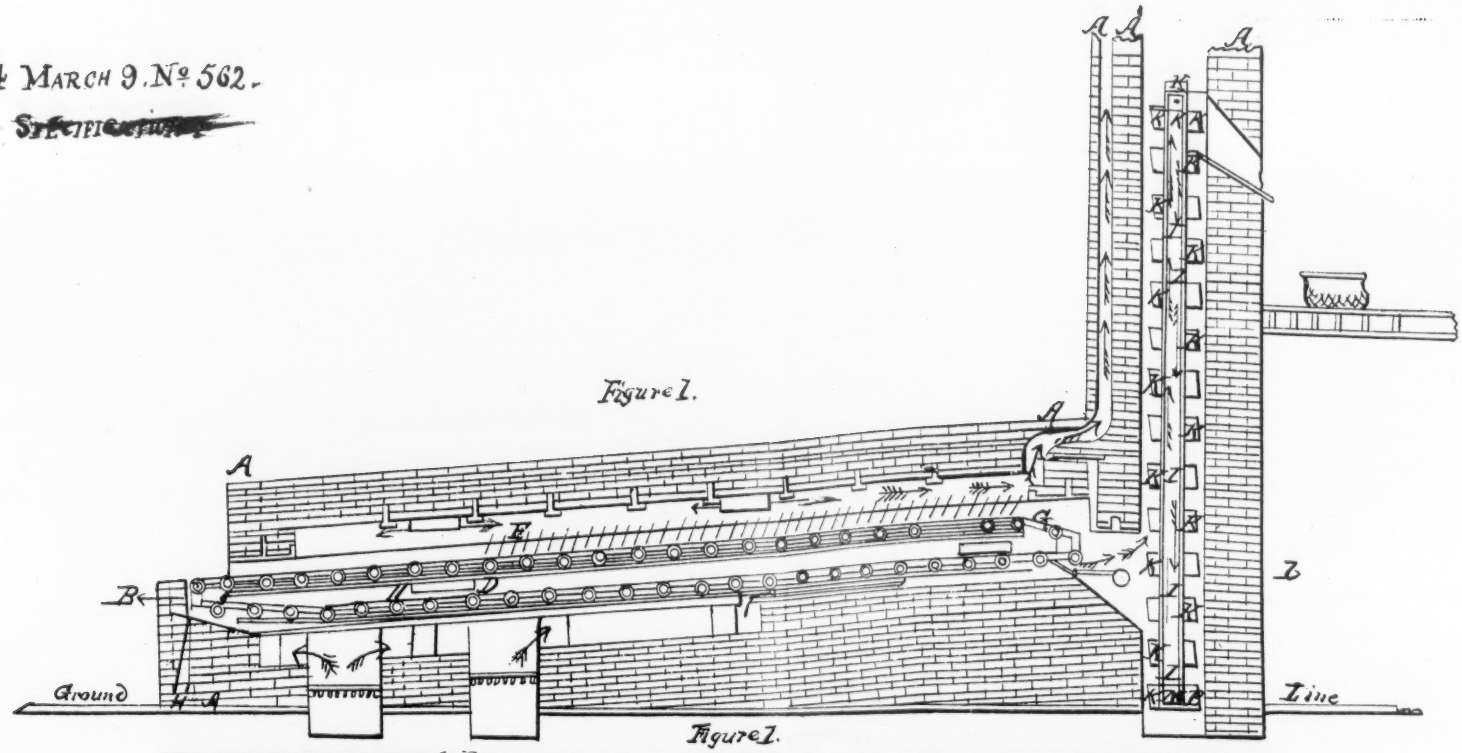


Figure 1.

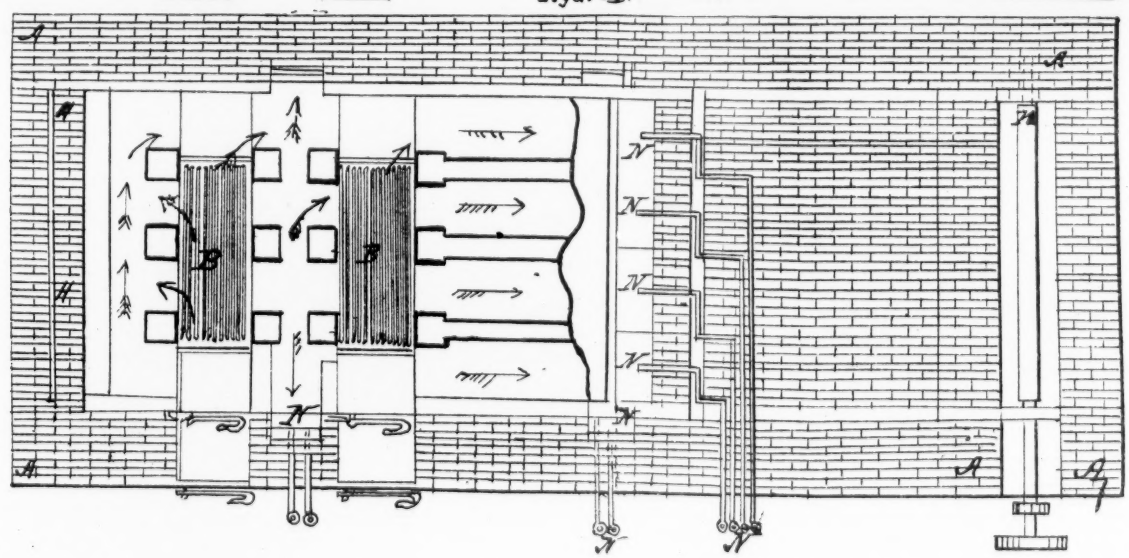


Figure 1.

No. 301. page 2663.
Gonneau
& Rozier Meyer & Co.

A D 1832 DECEMBER 22 N°11136
T&T VICARS' SPECIFICATION.

(1 SHEET)

FIGURE 2.

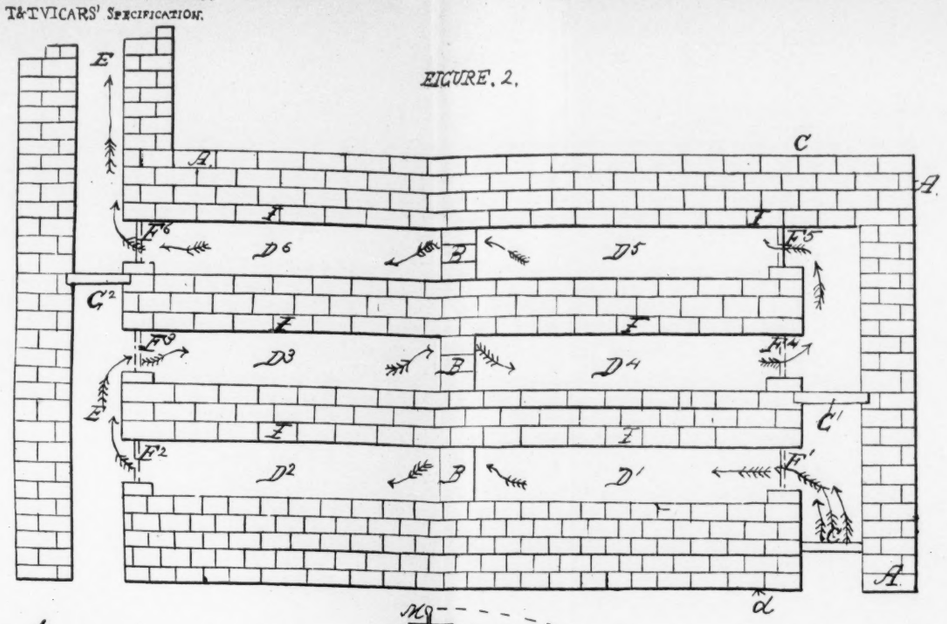


FIGURE 1.

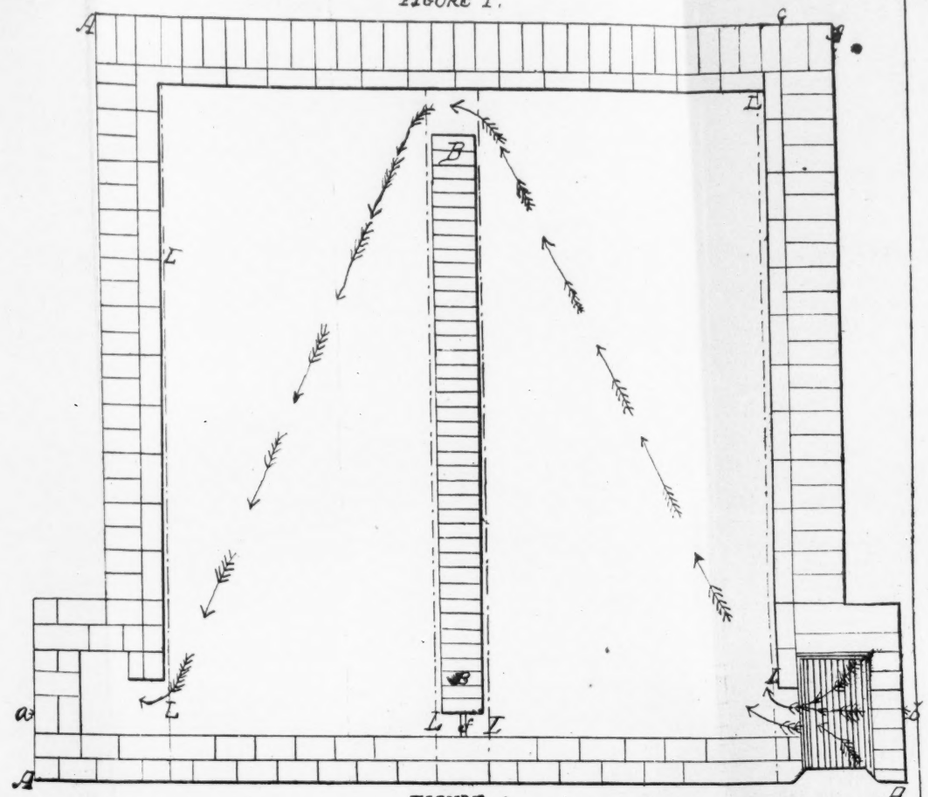


FIGURE 4

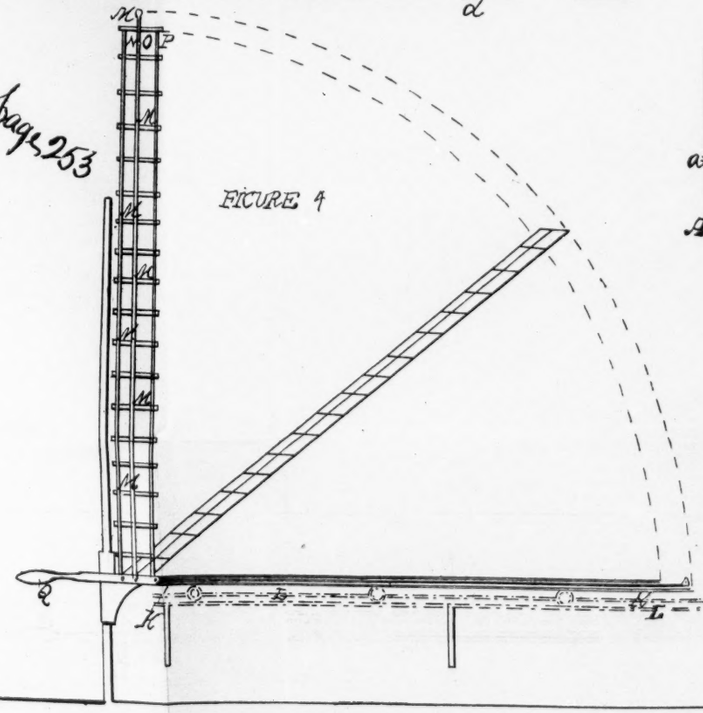
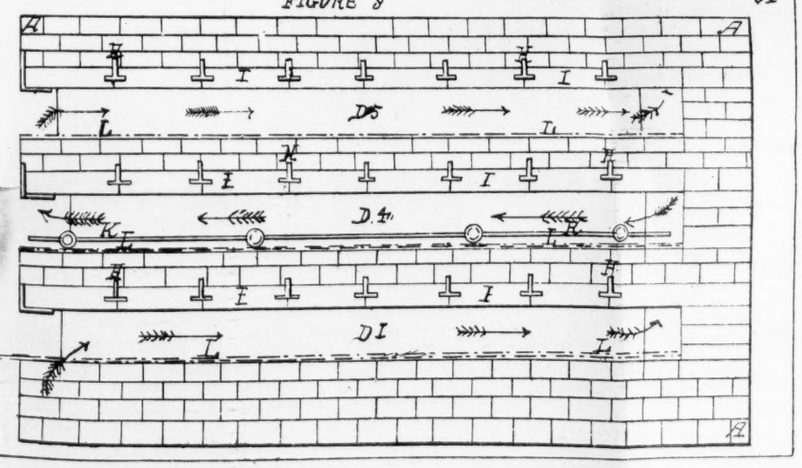


FIGURE 3



No. 301-
Garneau
v.
Dozier Heyl & Co.
} Page 253

253

AD: 850 Nov. 12 N: 13339
BALL'S SPECIFICATION.

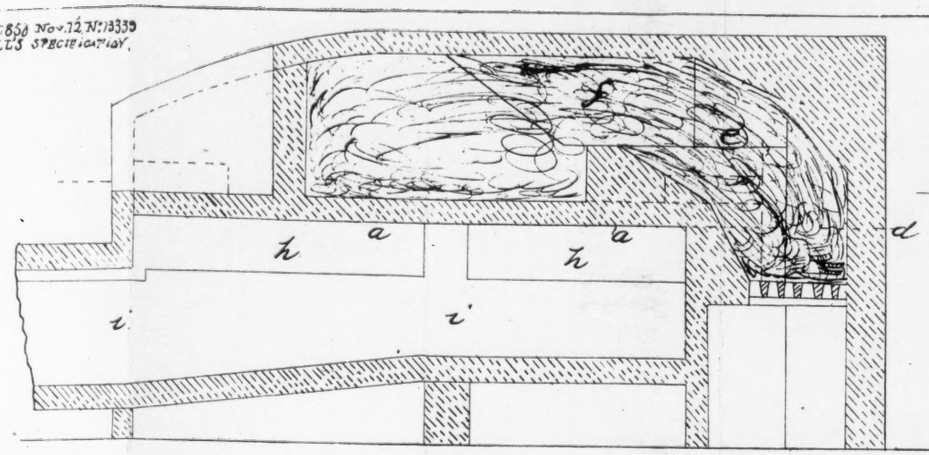


FIG. 3.

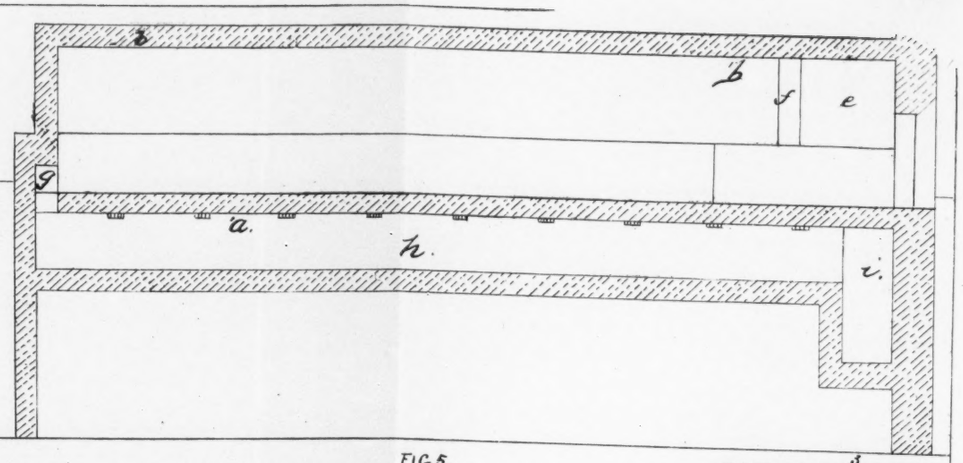


FIG. 5.

No. 301-
Garneau
v.
Dozier Keyes & Co.
} page 245.

FIG. 1.

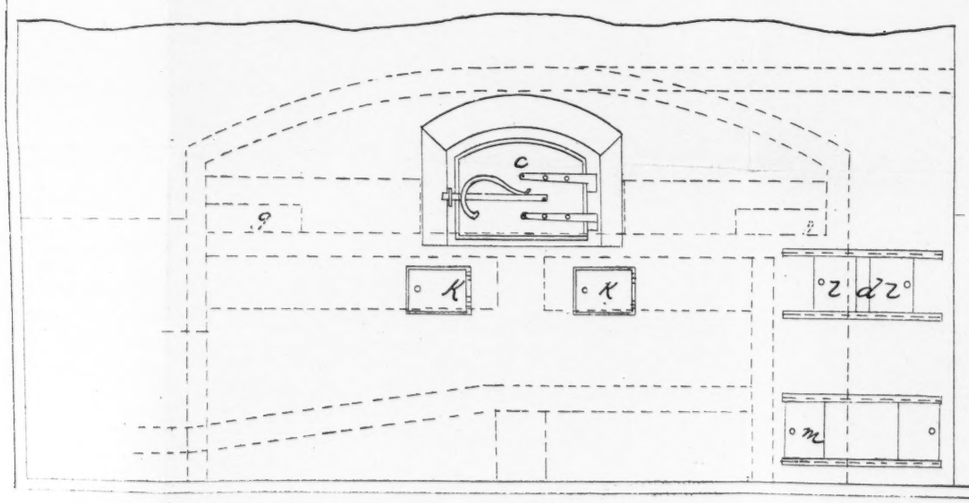
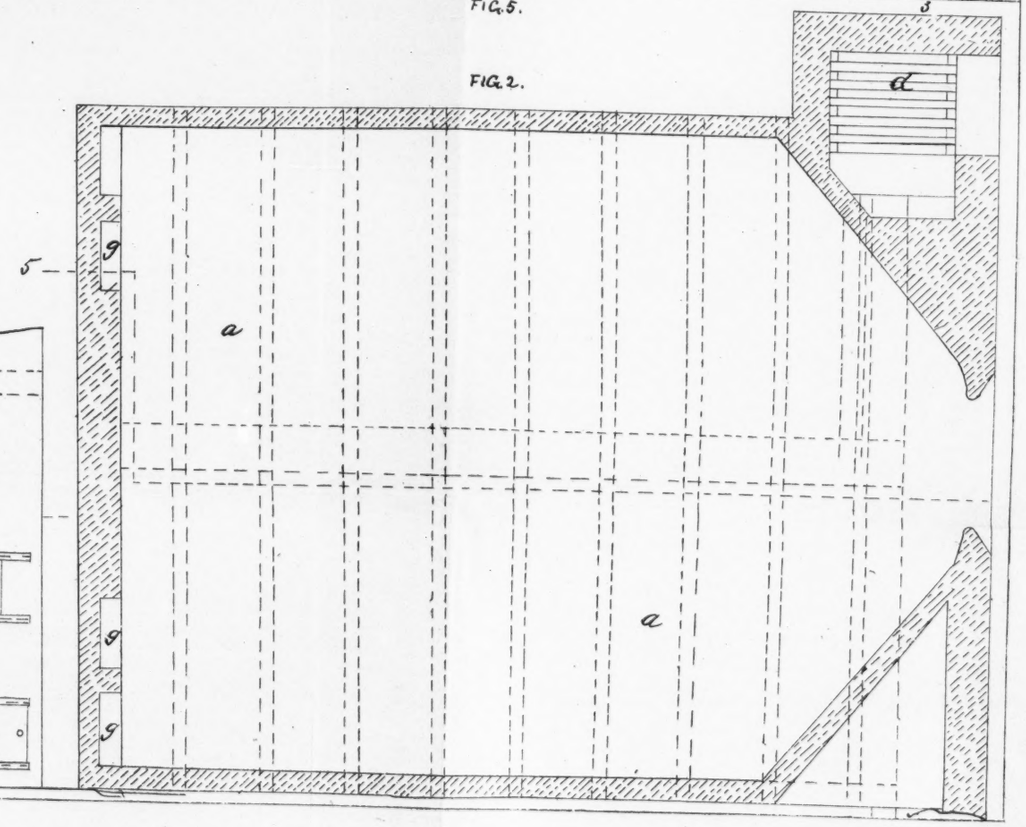


FIG. 2.



No. 301
Garneau
v.
Dozier Heyl & Co.

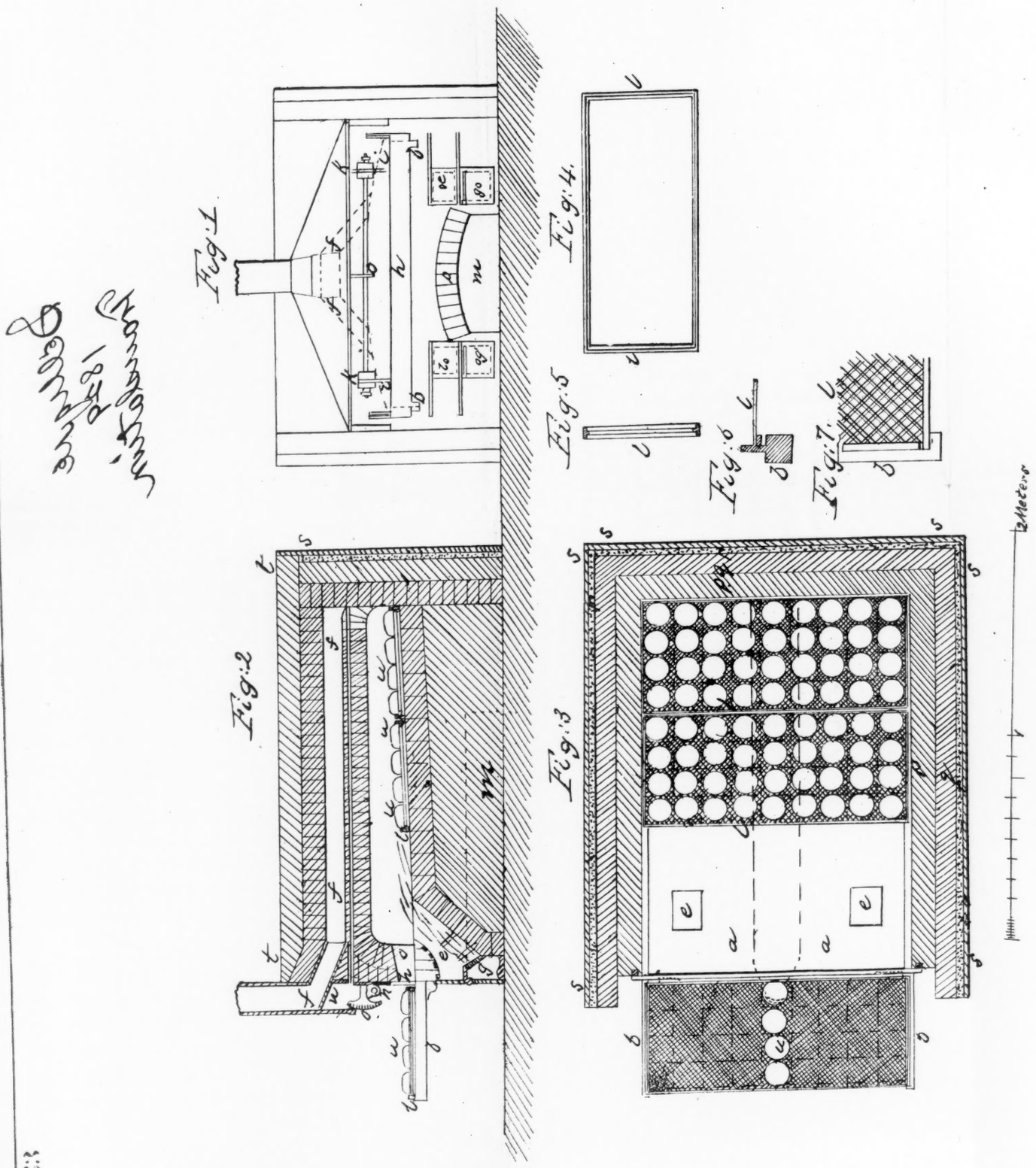
page 233

M. Pelligue.

Brevets D'Invention

Vol. 27-28.

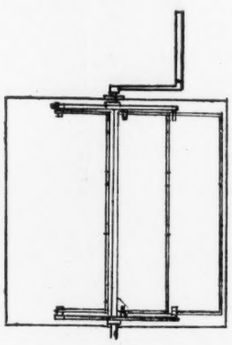
Plate 29.

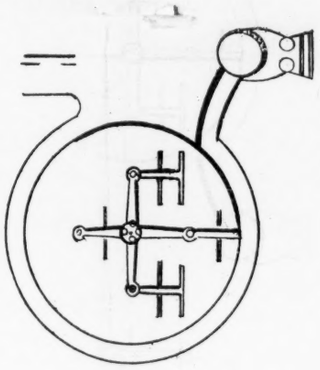


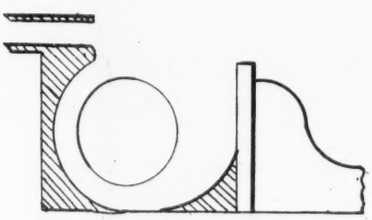
TOM. 55–56.

Four à bascule par Mr. Mathieu-Corrot.

No. 301–
Garneau
v.
Dozier Heyl & Co.
page 237





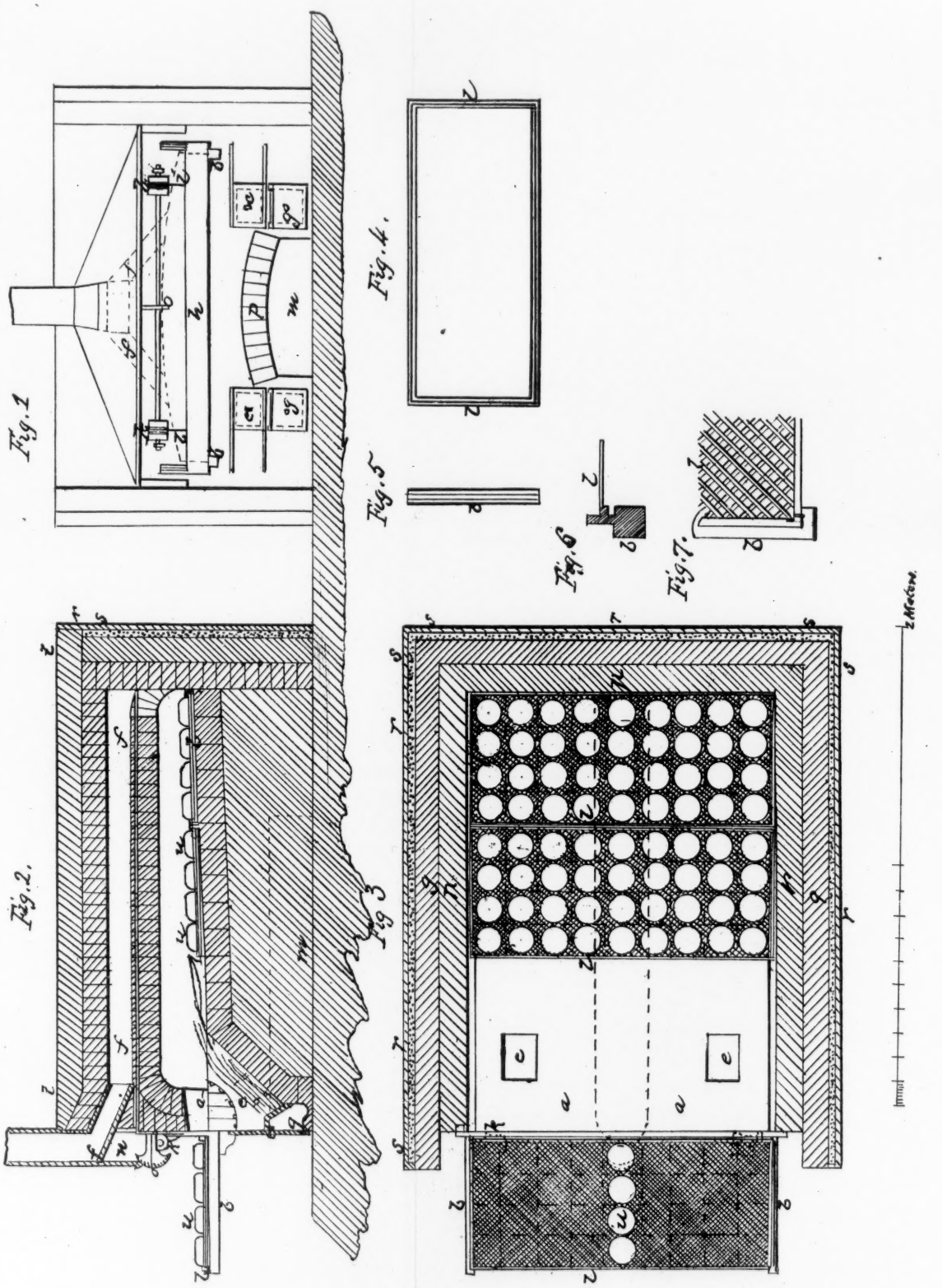


No. 301 page 225.
Garneau
& Dozier Hey & Co

M. Selligue

Brevets D'Invention.

Page. 224. Plate. 29.



No. 301
Garnemer
vs.
Dozier Heyl & Co.

Page 207.

D. McKenzie,

Baking Ovens,

No. 28,130 Patented May 1, 1860.

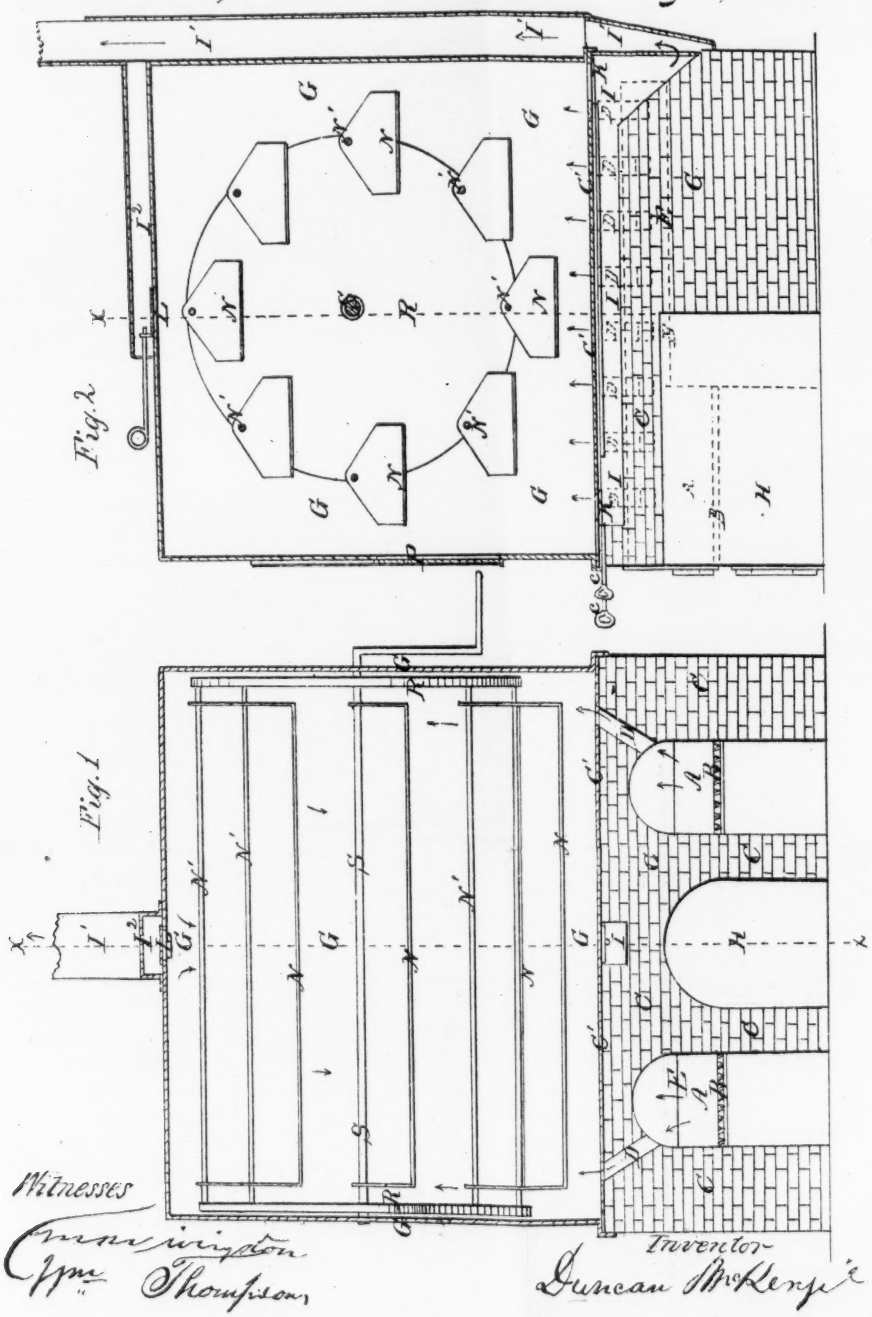


Fig. 2

Fig. 1

Witnesses
Chas. Livingston
Jno. Thompson

Inventor
Duncan McKenzie

No. 301
Garneau
& Dozier Meyer & Co.
page 211.

D. McKENZIE.

Bakers' Oven.

No. 6,397. Reissued April 20, 1875.

Fig. 2.

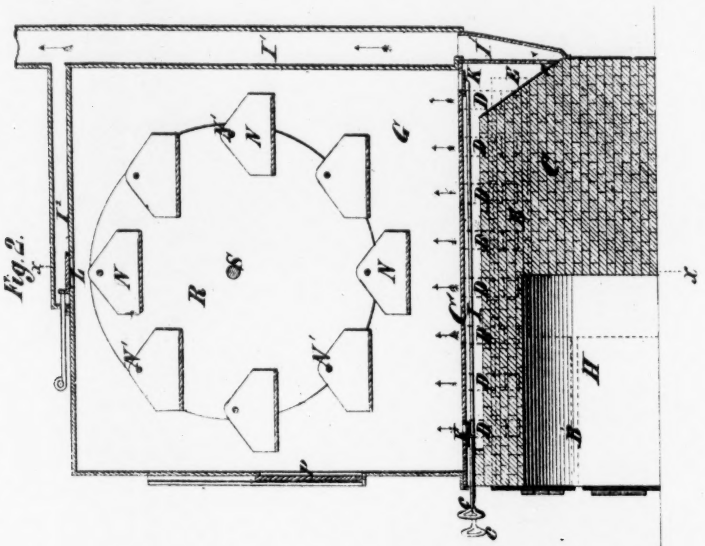
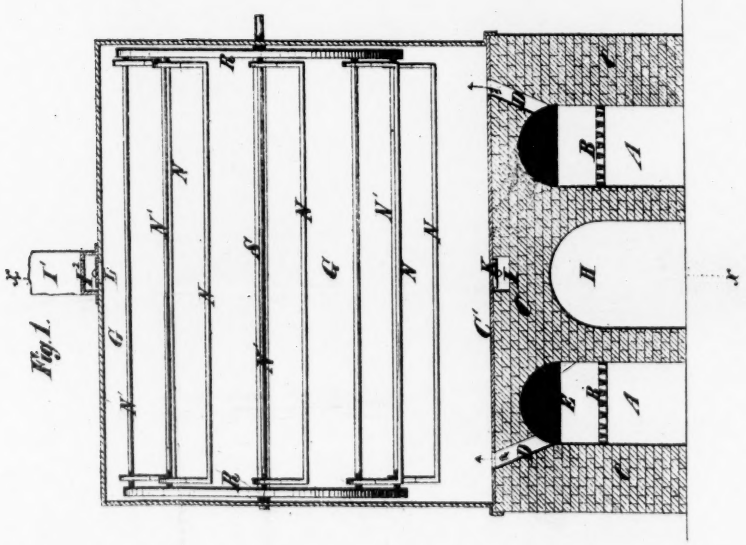


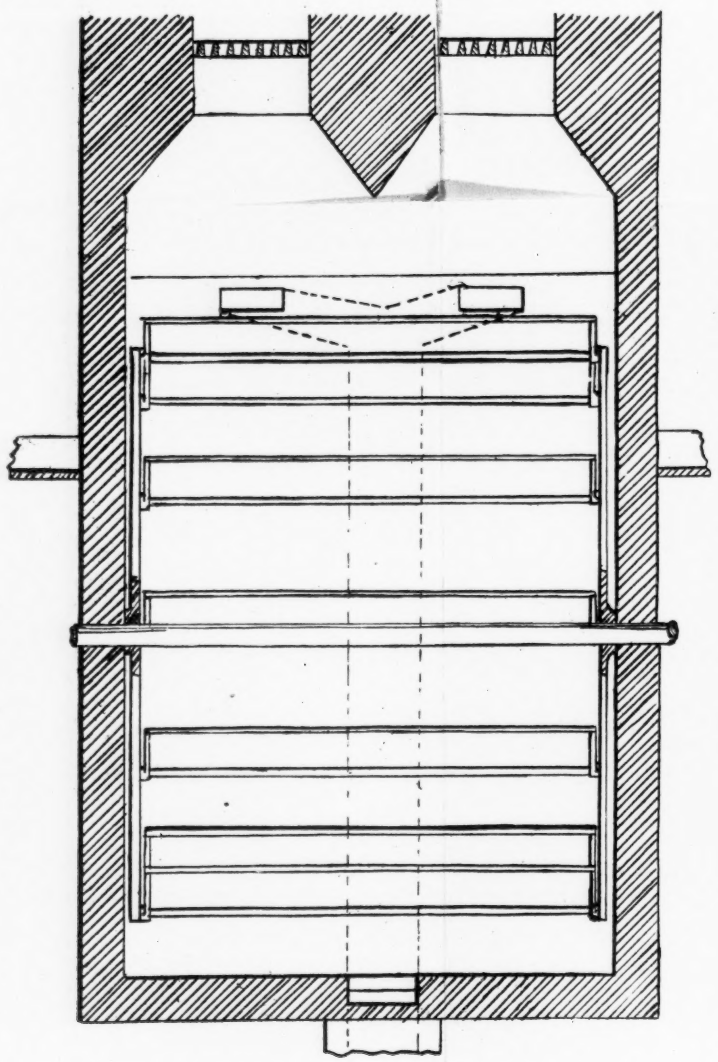
Fig. 1.

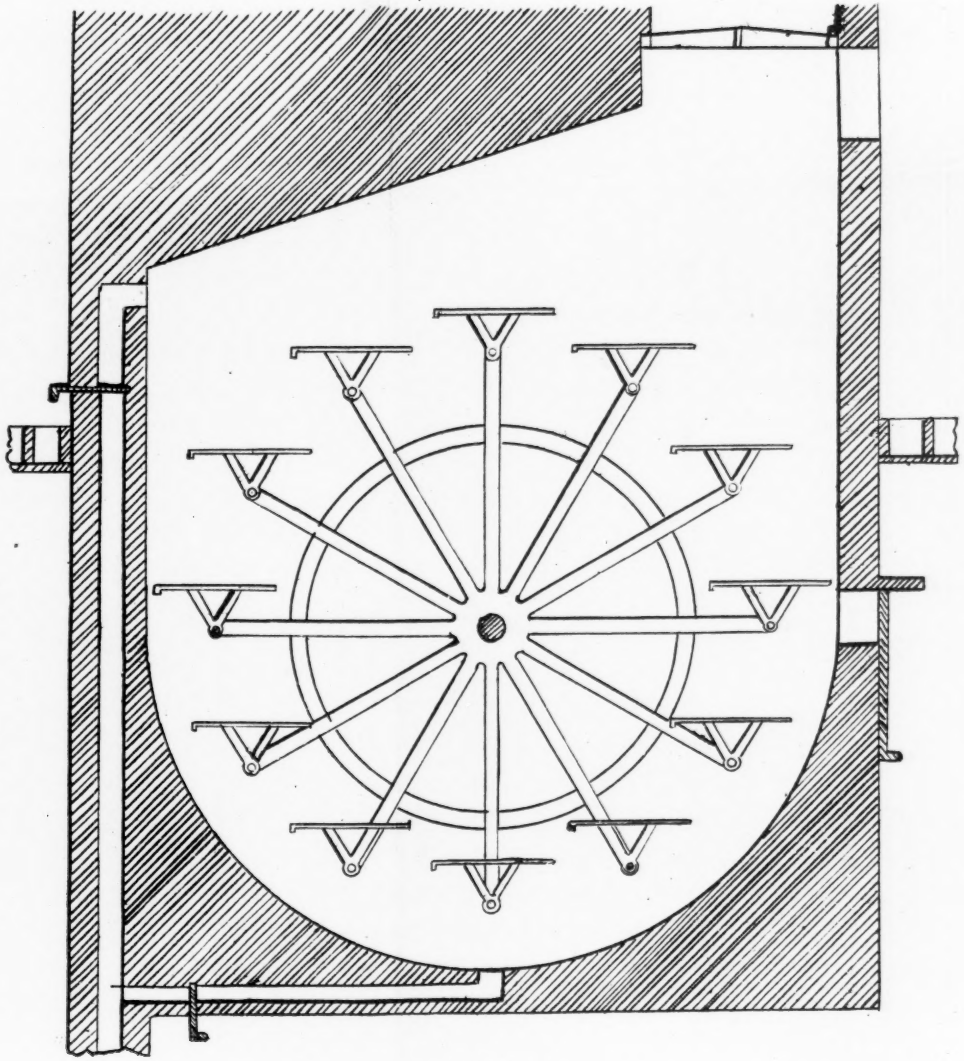


Witnesses:
D. J. Keamer
A. J. De Lacy

Inventor.
Duncan McKenzie

No. 301
Sarmecan
v.
Hazin Heyd & Co.





Duncan McKenzie Mason 180 Livingston St
Brooklyn

This is to Certify that I have this day Examined this plan and the accompanying Specification for this Radiating hot air Brick Oven and Believe the Same to be original.

March 3d 1858.

Witness the above.
David Fullman

Samuel Dr. Osman
Residence 136 Suffield st
Brooklyn

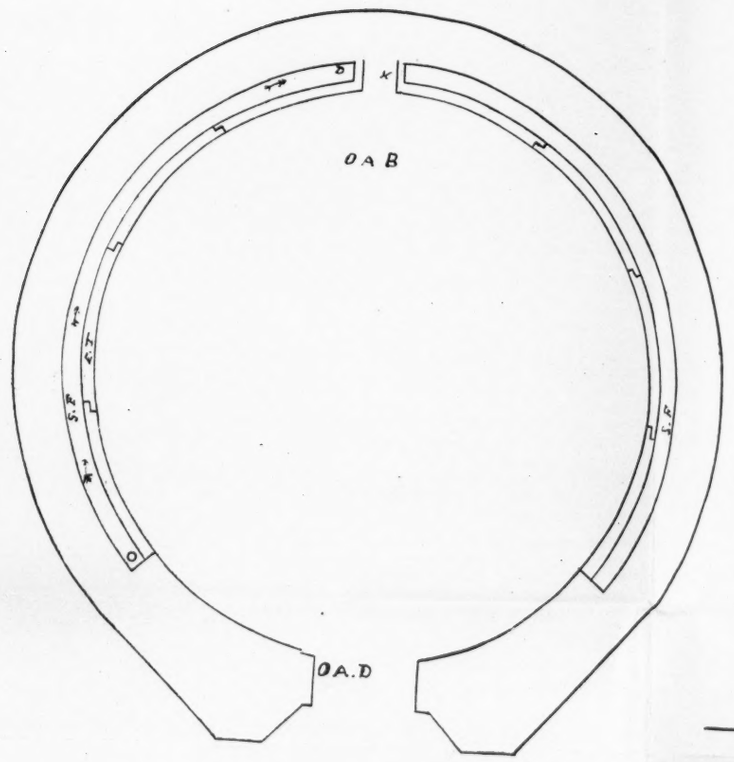
No. 301-
Garneau
v.
Dozier Heyl & Co

Residence 250 Livingston St Brooklyn

page 199

6

Fig. 2



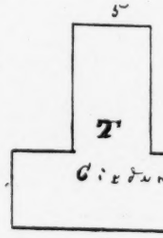


Fig 3

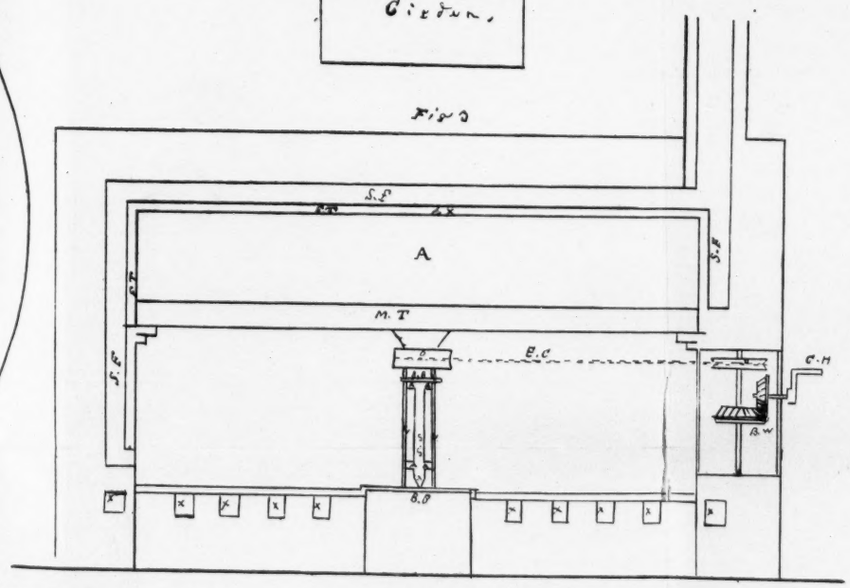
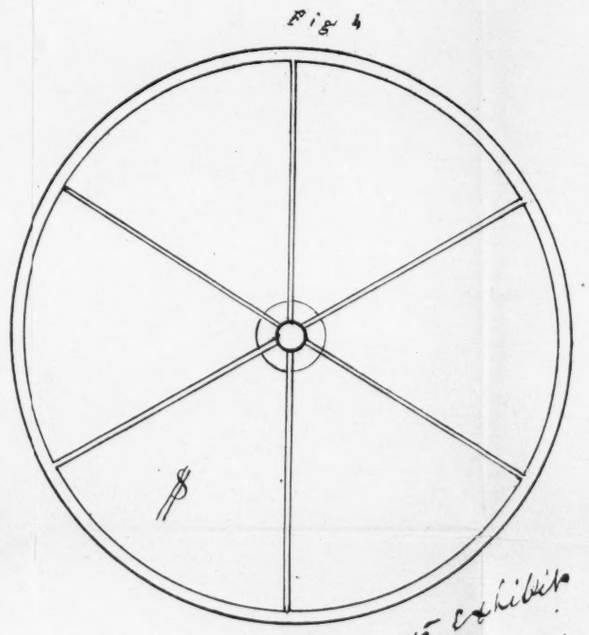


Fig 4

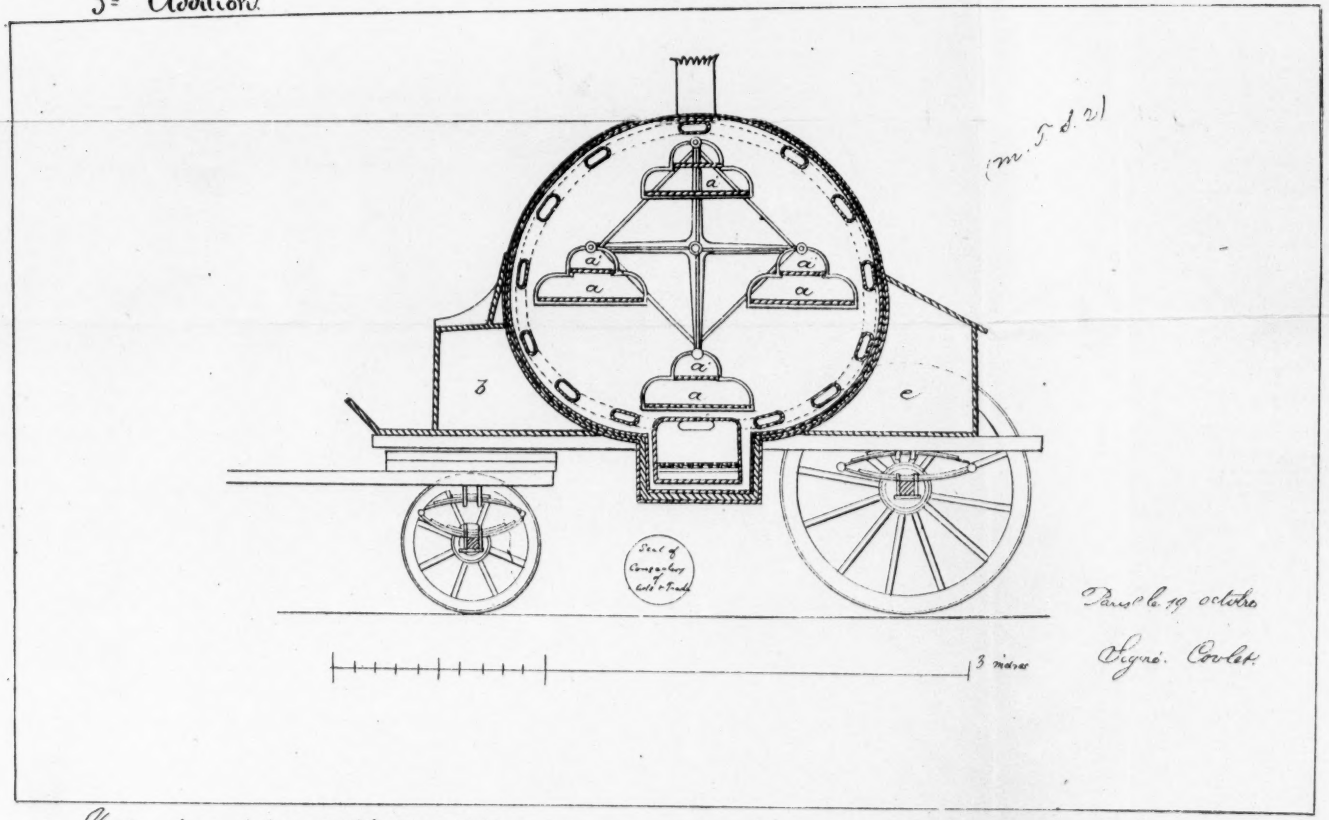


Complainants exhibits
McKenzie Drawing
Arthur Stern
Notary Public

28

No. 7.

9ème Addition



(m. F. d. 21)

Paris le 19 octobre

Signé. Corbet

Vu par etre annexé au Certificat additionnel
passé le 19 Octobre 1848, par le S. Corbet
Paris le 29 Decembre 1848
Pour le Ministre et par délégation
Le Secretaire general
Signé Flury

Pour copie conforme
Le Général de Division
Directeur
du Conservatoire des Arts et Métiers
Signé M. Morin
Paris le 12 Fevr. 1849

Seal

394 ~~Page 394~~

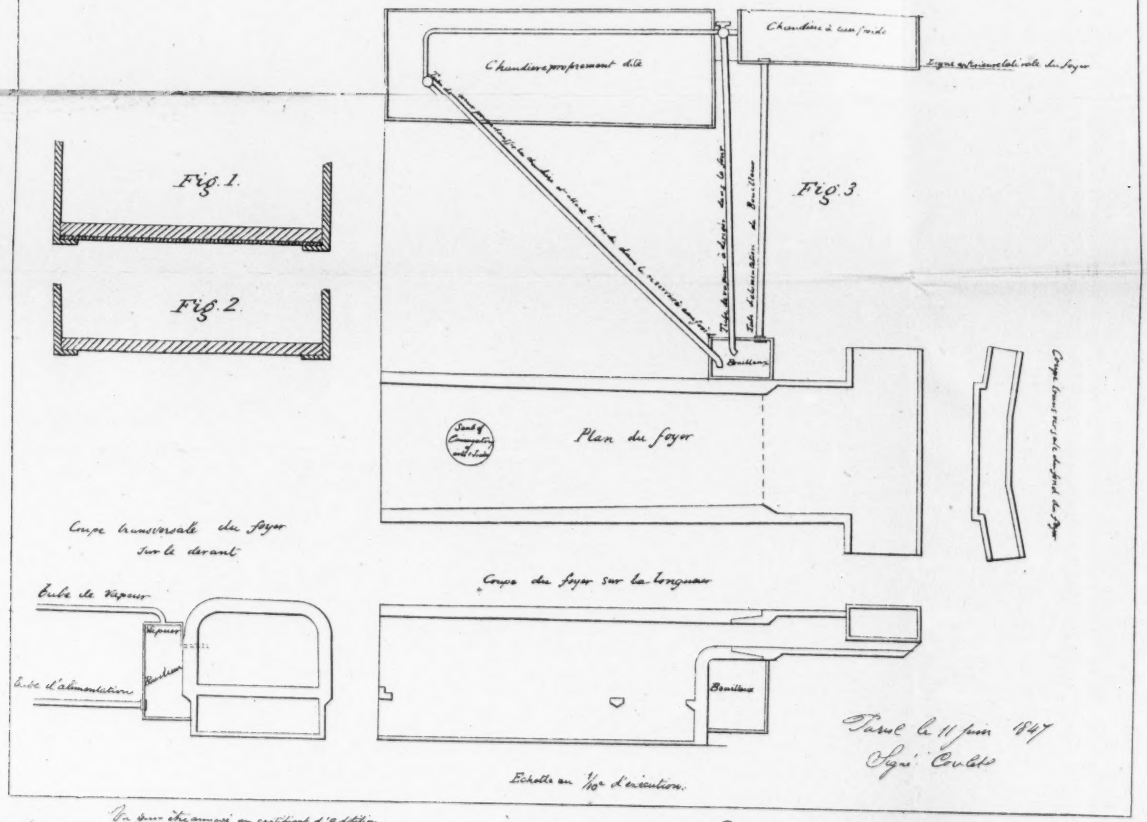
24

2ème Addition

No. 6

Plan des
Tubes Chaudières et Réservoirs

(M. D. S 2)



Paris le 11 juin 1847
Sgné Corbet

Vu pour être annexé au certificat d'addition
fait le 12 juin 1847 par le Sr Corbet
Paris le 20 août 1847
Sous la direction et par délégation
Le Membre de l'Académie, Directeur
Signé A. Tresca

Pour Copie Conforme
Le Général de Division
Directeur
des Commissions des Actes et Modèles
Signé M. Morin
Paris le 12 Février 1847

No. 5

2'6

Fig. 4.

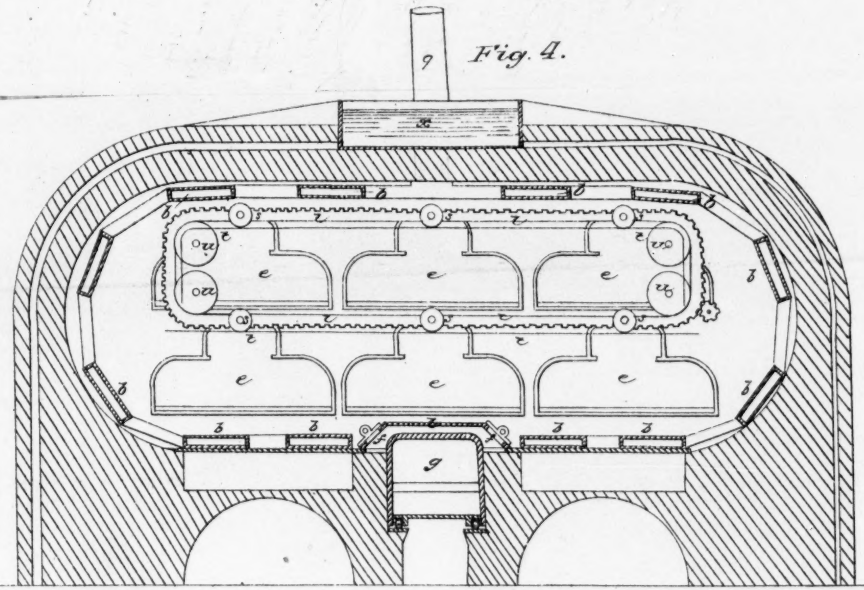
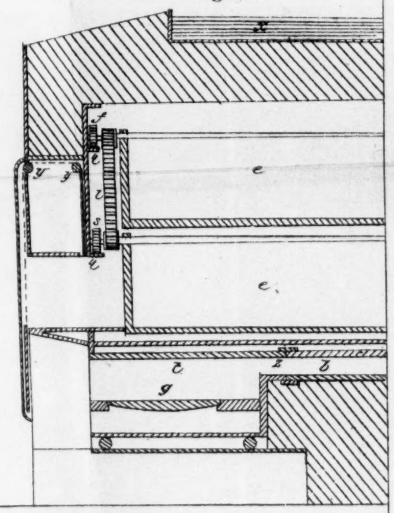


Fig. 5.



Echelle au 1/10

0 1 2 3 4 5 6 7 8 9 1 mètre

Paris le 7 juin 1847
Signé: Corbett

Vu pour être annexé au certificat d'addition pris le 7 juin 1847 par le Sr Corbett
Paris le 30 août 1847
Pour le Ministre et par délégation
le Maître des Requêtes Directeur
signé: A. Seurre

H 044

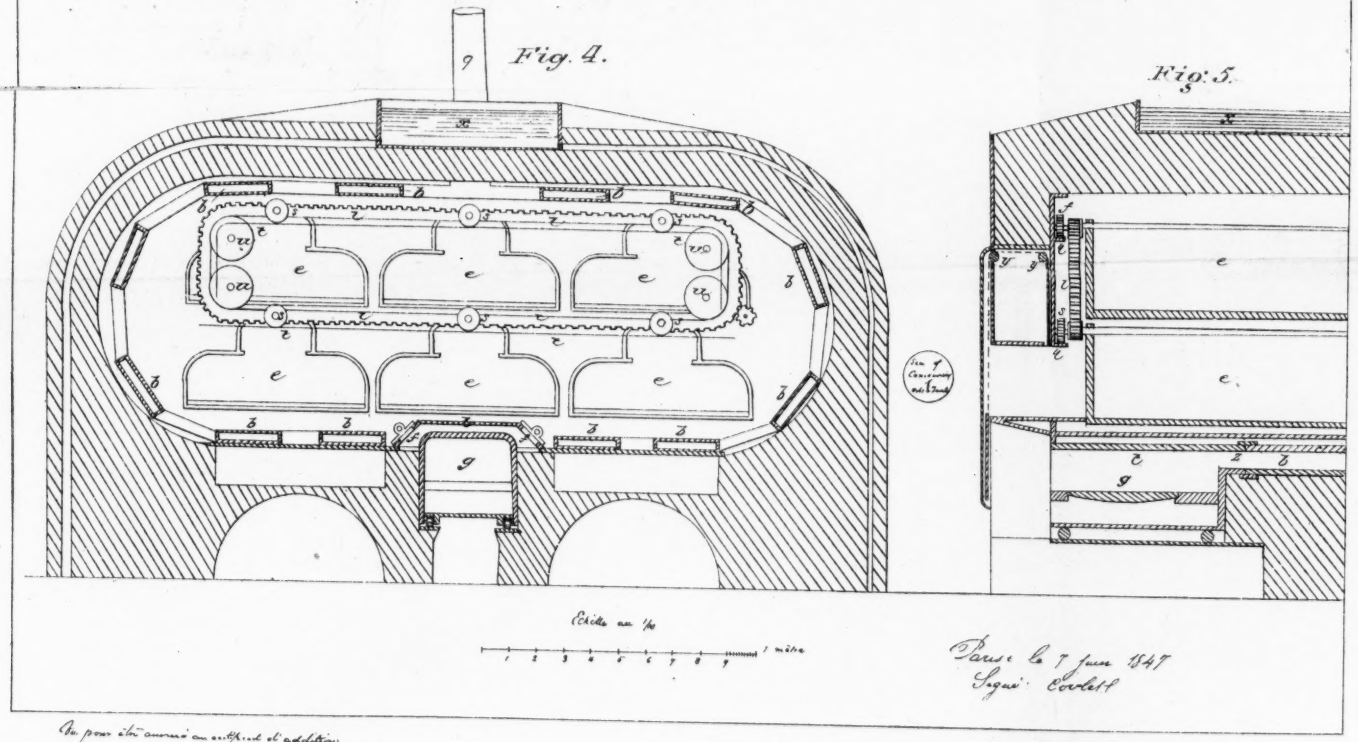
Pages 397

Vu et reçu conforme
le Journal de Commerce
Directeur
du Commissionnaire des Ch. Nolleries
Signé: M. Allonnier
Paris le 13 Février 1848

Seal

26

No. 5



Paris le 7 Juin 1847
Signé: Corbett

Vu pour être annexé au certificat d'addition
Paris le 7 Juin 1847. Pour le Sr. Corbett
Paris le 30 Août 1847
Pour le Ministre et par délégation
le Maître des Requêtes Directeur
Signé: A. Seurat

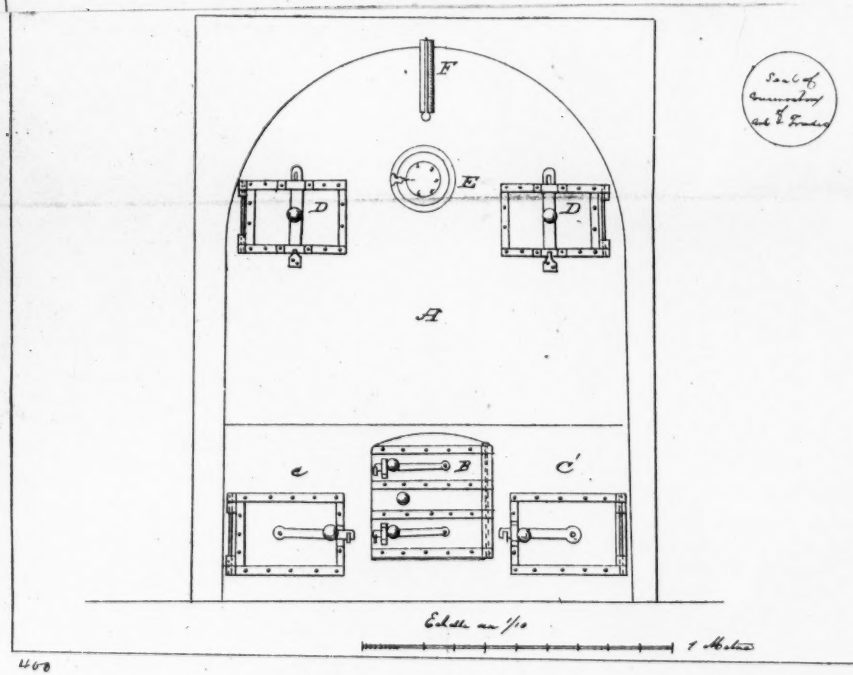
404

Pour copie conforme
le Général des Ponts et Chaussées
Directeur
du Conservatoire des Arts et Métiers
Signé: Morin
Paris le 19 Février 1874

Seal

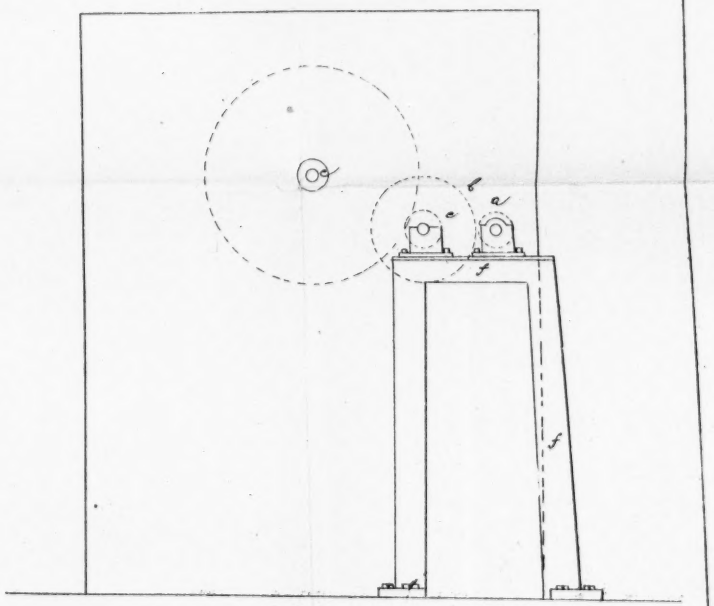
No. 1

Fig. 1.



Seal of Commissary of the U. States

Fig. 2.



468

Vu pour être annexé au Brevet de quinze ans pris le 19 Juin 1868 par le Sieur Ce et. Paris le 11 avril 1868
Pour le Ministre et par délégation
Le Maître des Requêtes Directeur

Recommended to be annexed to the 15 years Patent taken on the 19th of June 1868 by Mr Cobb
Paris Aug 11th 1868
For the Minister and by delegation
The Master of applications and Director
(Signed) A. Leroux

Pour Copie conforme
le Ministre de Commerce
Directeur
Du Conservatoire des arts et Métiers
(Signed) Mellonio
Paris, le 28 November 1872

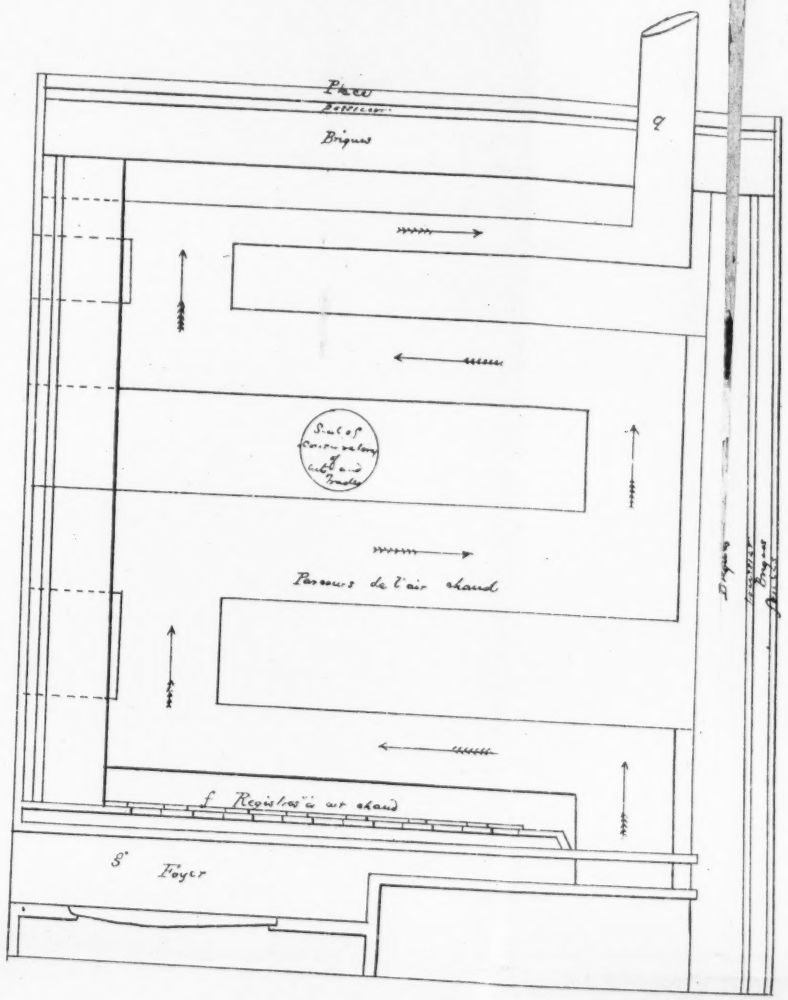
Seal

391

1103 1re Addition.

Fig. 3
Four Corlet

Pl. 2



Coupe sur la longueur 1/10

Paris le 7 juin 1847
Signé: Corlet

Vu pour être annexé au rapport d'admission
fait le 7 Juin 1847 par le Sr Corlet
Paris le 30 avril 1849
Pour le Ministre et par délégation
Le Maître des Requêtes Directeur
Signé: A Tarbé

Pour copie conforme
Le Général de Division
Directeur
du Conservatoire des Arts et Métiers
Signé Morin

Paris le 12 Février 1873

24

Brevet

No. 2

Fig. 3.

(M. S. 82)

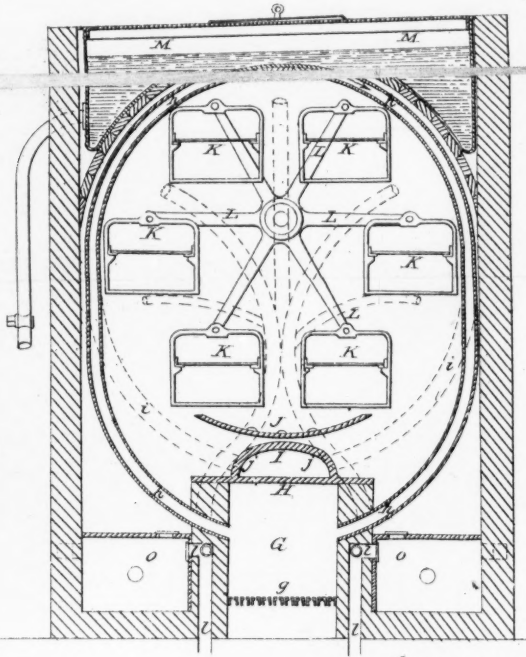
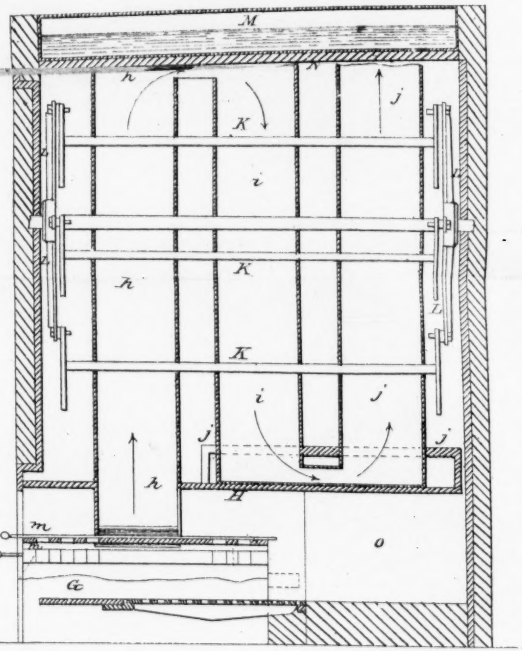


Fig. 4.



Echelle au 1/10

1 Metre

Fig. 6

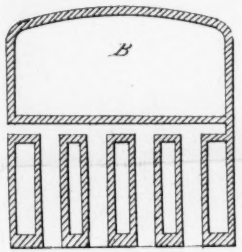
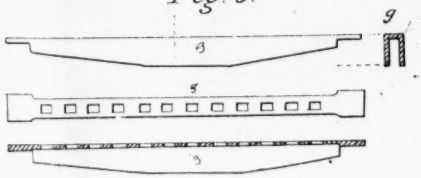


Fig. 5.



Vu pour être annexé au brevet de quinze ans du 13 Juin 1846 pris par le Sieur Coulet
Paris le 11 août 1846
Pour le Ministre et par délégation
Le Maître des requêtes Directeur
Signé: A. Tenac

Vu pour être annexé au brevet de quinze ans du 13 Juin 1846 pris par le Sieur Coulet
Paris le 11 août 1846
Pour le Ministre et par délégation
Le Maître des requêtes Directeur
Signé: A. Tenac

Pour copie conforme
le Général de Division
du Conservateur des arts et Métiers
Signé: Morin
Seal
Paris 20 Novembre 1872

Vu pour être annexé au brevet de quinze ans du 13 Juin 1846 pris par le Sieur Coulet
Paris le 11 août 1846
Pour le Ministre et par délégation
Le Maître des requêtes Directeur
Signé: A. Tenac

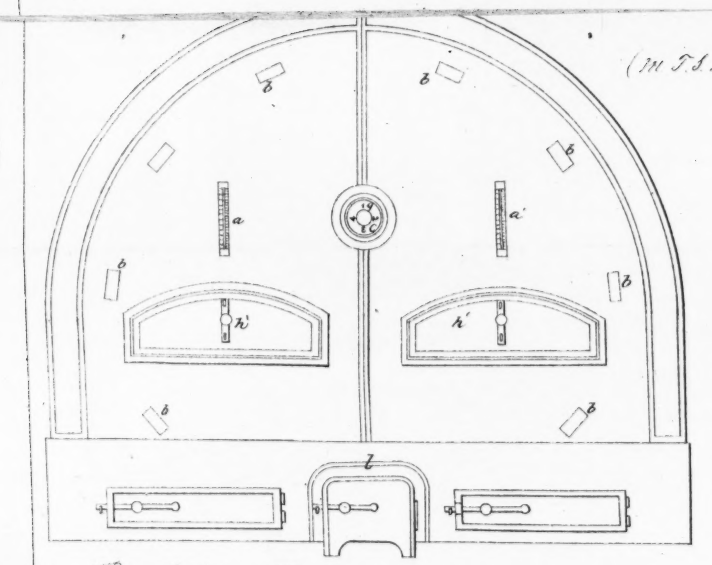
1 Addition.

No. 3

PL 1re

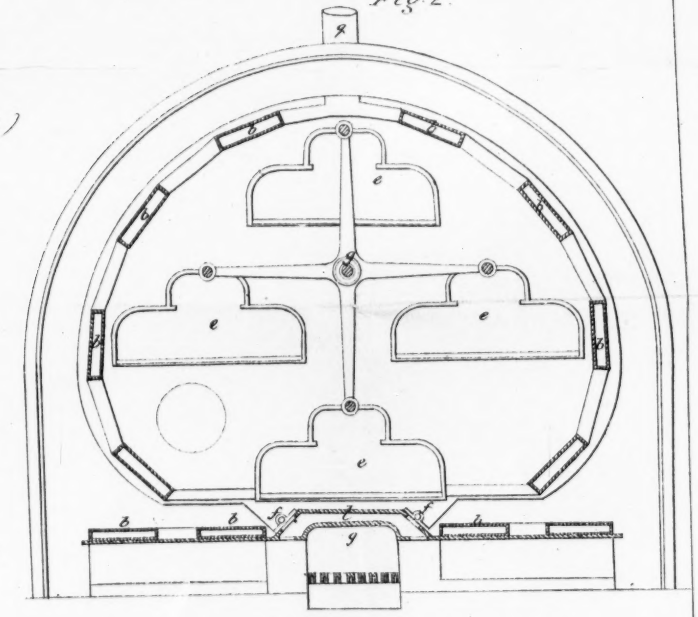
Four Coulet

Fig. 1



(M. F. 1 2)

Fig. 2



Paris le 7 juin 1847 Vue de face
Signé Coulet

Coupe transversale Echelle 1/10

390 Vu pour être annexé au certificat d'addition pris le 7 Juin 1847 pour le Sr Coulet

H02 Paris le 30 août 1847
Pour le Ministre et par délégation
Le Maître des Requêtes Directeur
Signé A. Lemaire

Pour copie conforme
Le Général de Division
Directeur
de la Conservation des droits et actions
Signé [illegible]

Seal

Paris le 12 Février 1873

No. 48 -
Garneau
v.
Dozier, Weyl + Co
} page 5

H. Ball
Oven.

No. 4026. Reissued Jun. 14. 1870

Fig. 2.

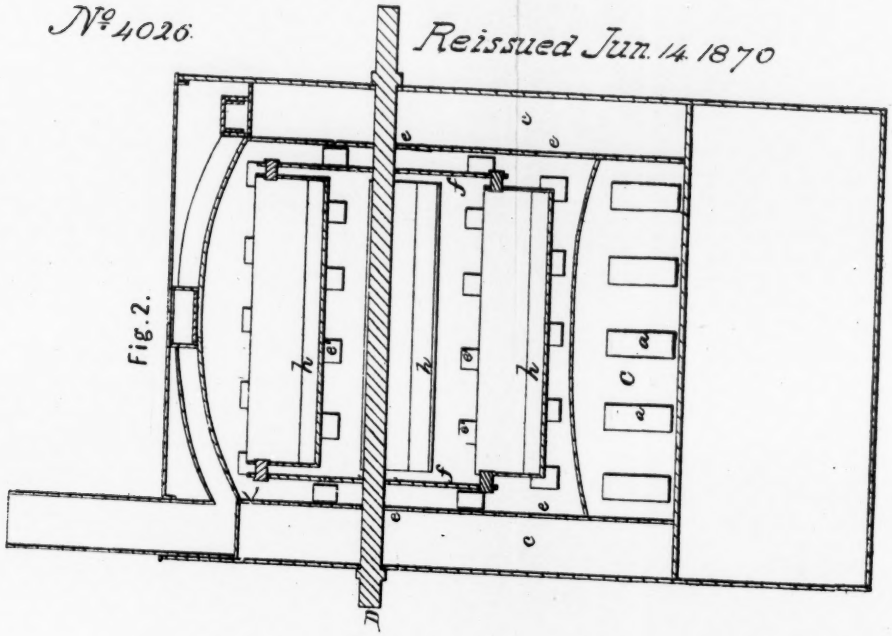
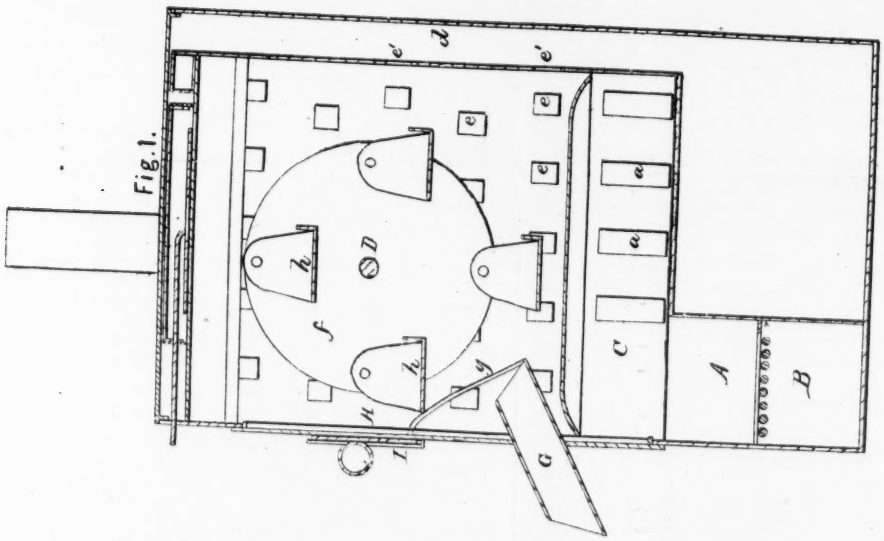


Fig. 1.



No. 301
Garneau
v.
Dozier, Meyer & Co
page 603.

2 Sheets--Sheet 2

D. McKENZIE.

Improvement in Bakers' Ovens.

No. 132,305. Patented Oct. 15, 1872.

Fig: 3.

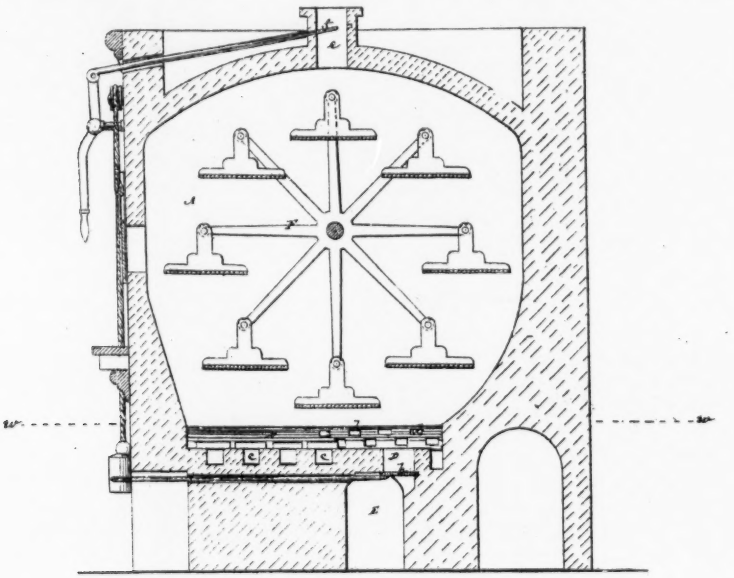
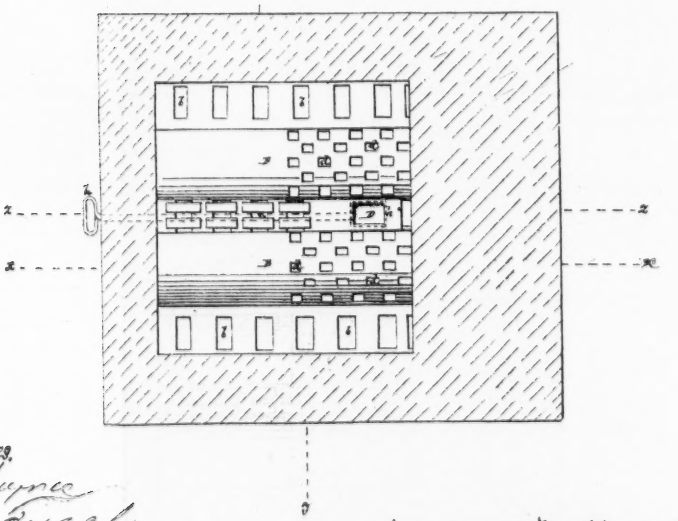


Fig: 4.



Witnesses.
Thos. Haynes
Fred. Fusek

Duncan McKenzie

No. 301 –
Garneau
v.
Dozier Hayes & Co.
} page 301.

2 Sheets--Sheet 1.

D. McKENZIE.

Improvement in Bakers' Ovens.

No 132,305. Patented Oct. 15, 1872.

Fig: 2.

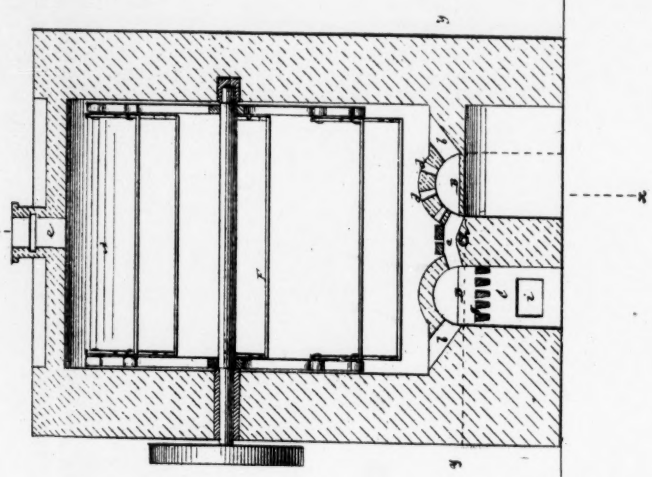
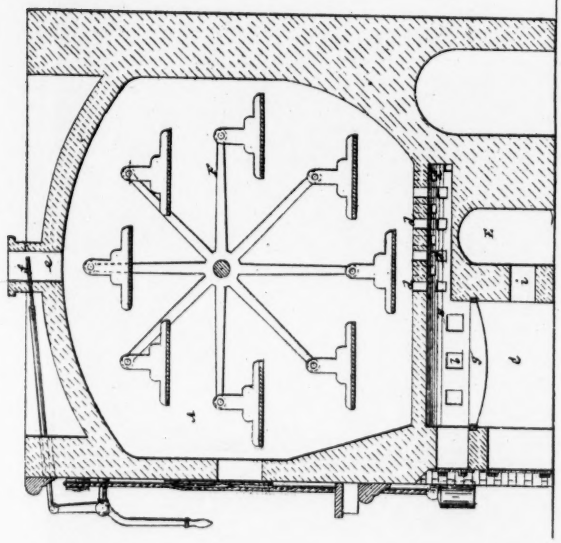


Fig: 1.



Witnesses.
Fred Haynes
Fred Isaac

Duncan McKenzie

No. 301 -
Garneau
v.
Dozier Heyl & Co.
} Page 283

C. C. Jennison.

Bake Oven.

No. 22,809. Patented Feb. 1, 1859.

Fig. 4.

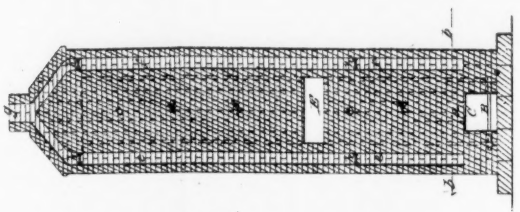


Fig. 3.

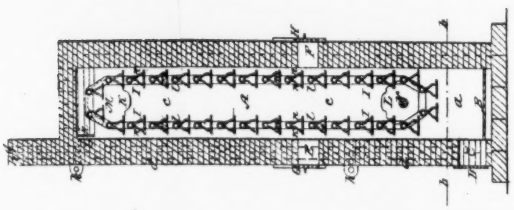


Fig. 6.

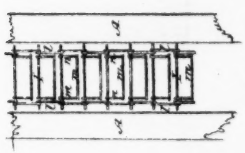


Fig. 5.

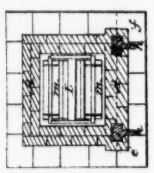


Fig. 2.

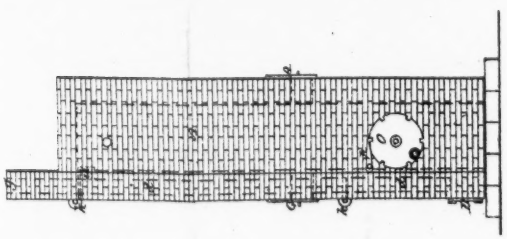
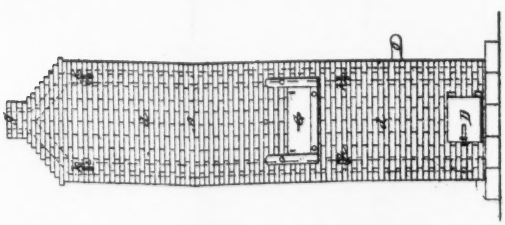


Fig. 1.



No. 301 -
Garneau
& Dozier Meyler Co.
} Page 287

2 Sheets--Sheet

GEORGE C. JENNISON.

Baker's Oven.

No. 4,783. Reissued March 5, 1872.

Fig. 1

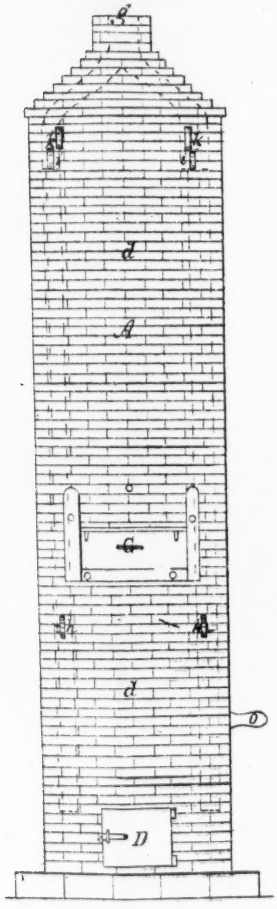
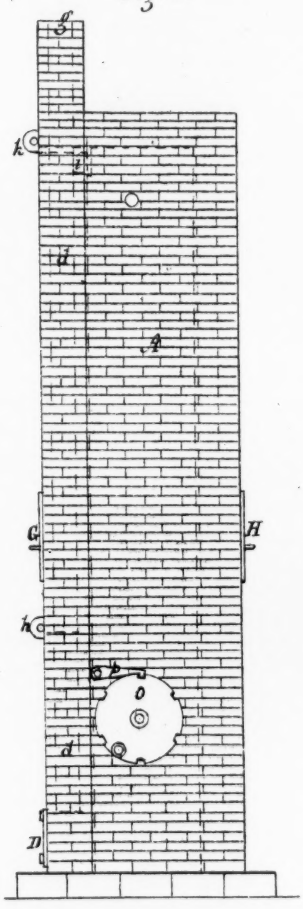


Fig. 2



Witnesses.
Isaac H. Hows
William Donnelly

George C. Jennison.
By Thos. D. Meyler
Atty

No. 301.
Garneau & Dozier Weigl & Co
page 289.

2 Sheets--Sheet 2.

GEORGE C. JENNISON.

Baker's Oven.

No. 4,783. Reissued March 5, 1872.

Fig 6

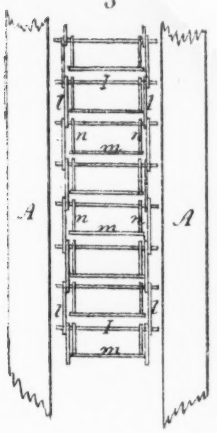


Fig 3.

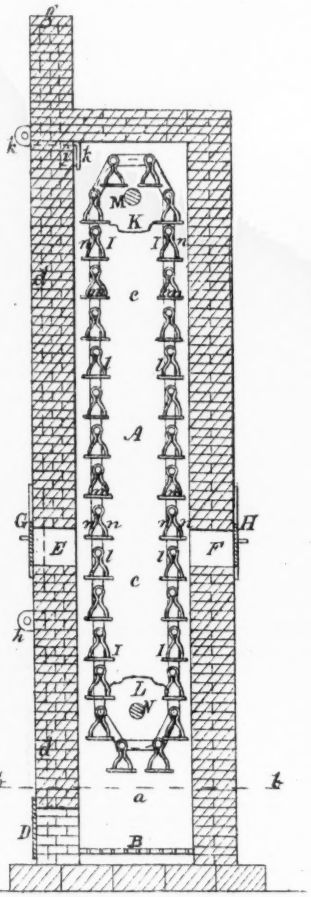


Fig 4.

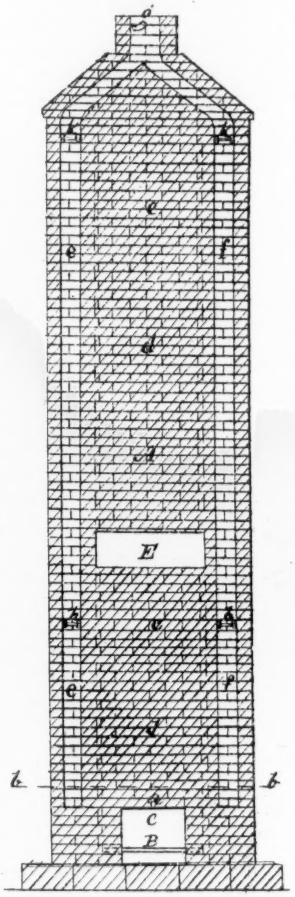
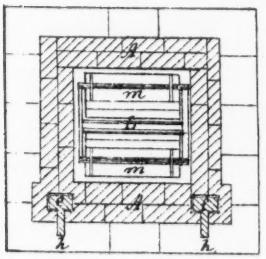


Fig 5.



Witnesses.
Jesse H. Howe
William A. Dunnell

George C. Jennison
By Thos. P. Howe
Atty

No 301
Garneau
v.
Dozier Heyl & Co.
page 269

H. Ball

Oven.

No. 15753

Patented Sept. 23. 1856

Fig. 2.

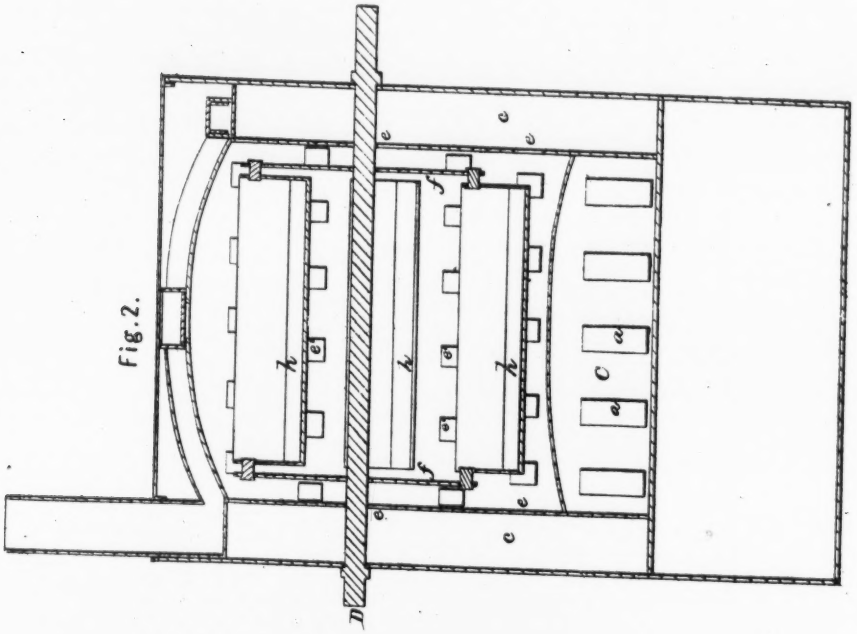
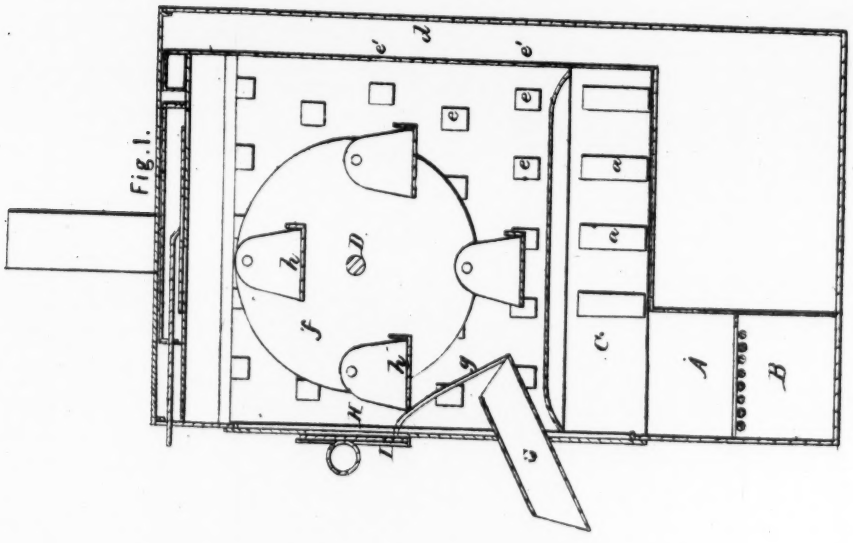
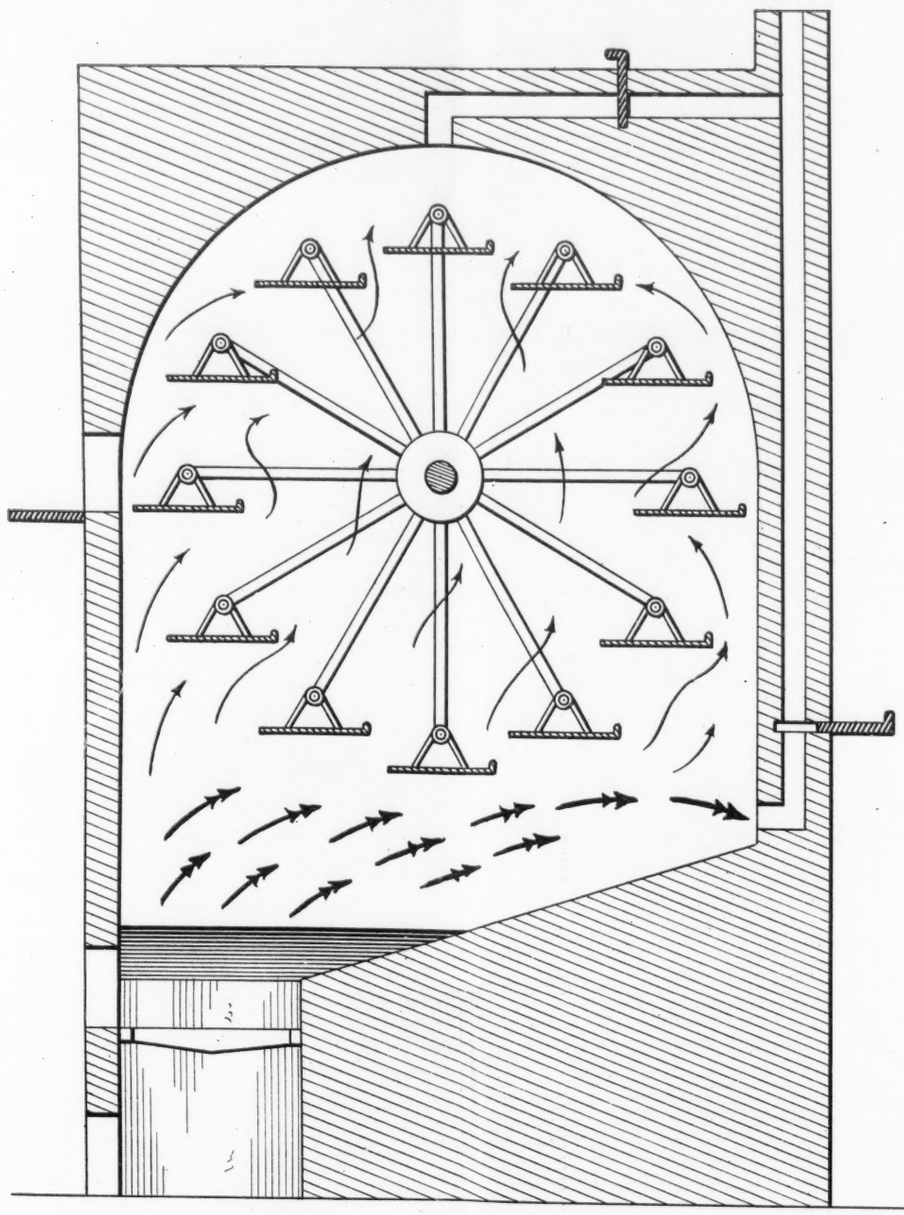


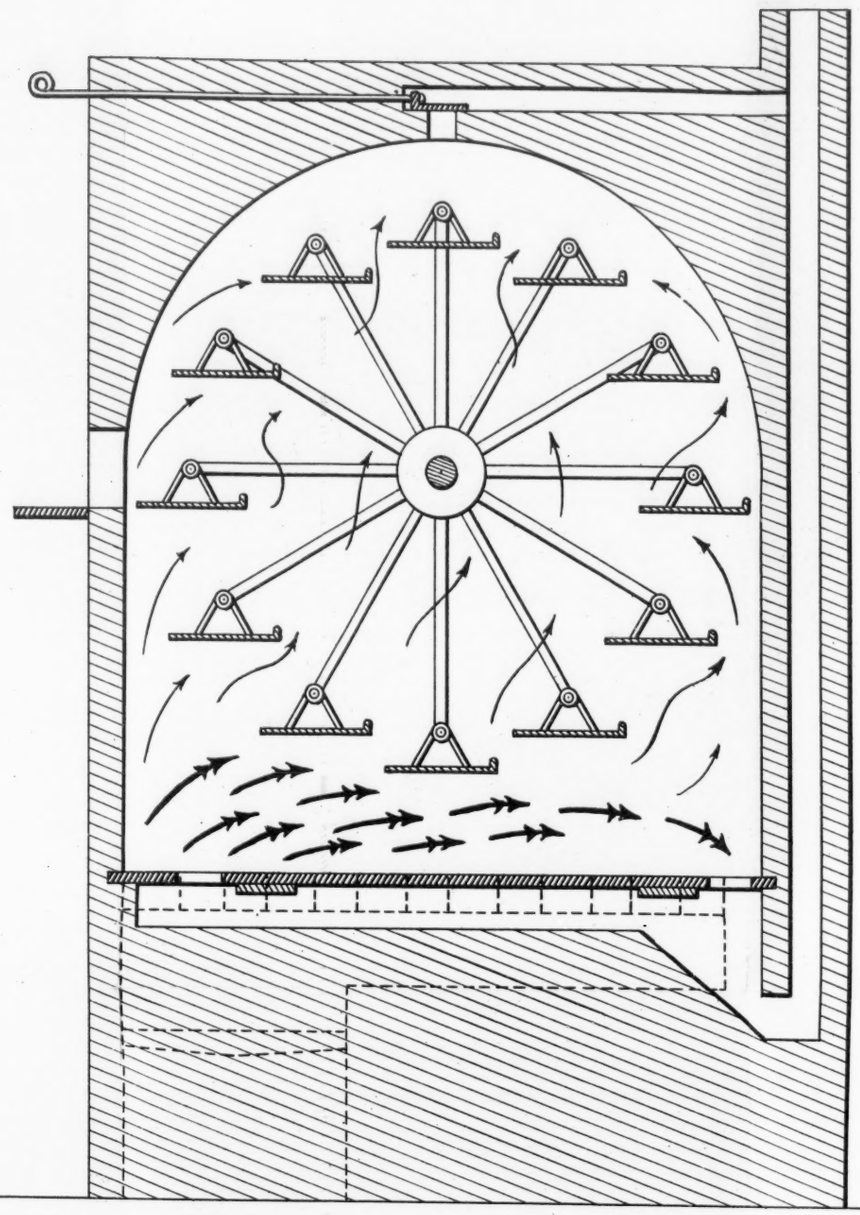
Fig. 1.

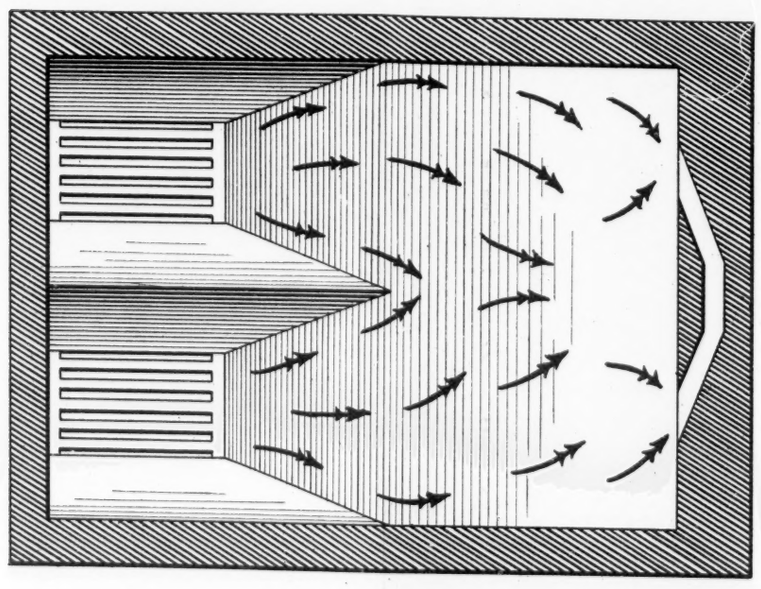


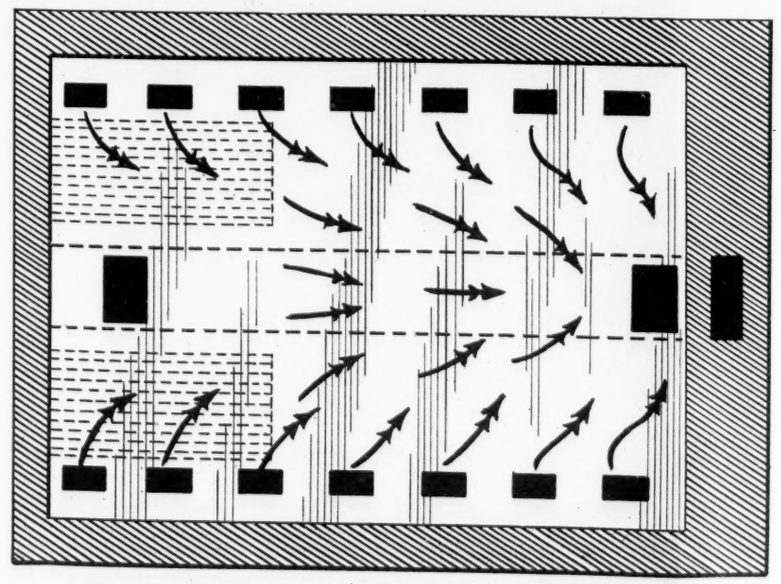
Defendant's Oven.



Complainant's Oven.







COURSE OF LIGHTER PRODUCTS ⟶

" " HEAVIER " ⟶